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**SITE CHARACTERIZATION REPORT
VERDESE CARTER PARK
OAKLAND, CALIFORNIA**

Prepared for

City of Oakland
City Attorney's Office
505 14th Street, 12th Floor
Oakland, CA 94612
August 19, 1993

Prepared by

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Woodward-Clyde Consultants



Engineering & sciences applied to the earth & its environment

August 19, 1993
93C0243A

Ms. Vivian O'Neal, Esq.
City of Oakland
City Attorney's Office
505 14th Avenue, 12th Floor
Oakland, CA 94612

Re: Site Characterization Report
Verde Carter Park Site Characterization Project
98th and Bancroft Avenues, Oakland

Dear Ms. O'Neal:

Woodward-Clyde Consultants (WCC) is pleased to submit this report of our site characterization of Verde Carter Park. The purpose of this investigation was to identify the general distribution of soil contamination, if any, in the shallow soil zone at the park.

A draft report was submitted to you on July 19. This final report incorporates the comments of yourself and City staff to the draft, as well as comments by the Alameda County Department of Environmental Health. This report also includes the results of additional sampling of the precipitate material found in some of the pavement cracks in the play courts area of the park.

It is a pleasure to be of service to the City. Please call me at 874-3288 if you have any questions.

Sincerely,

Michael McGuire, P.E.
Project Manager

Enclosure

Q:\93\15810.1(93C0243A)\1

M0820930838

ACCESSION #: 307393INITIALS: ML**SAMPLE CONDITION UPON RECEIPT CHECKLIST**
(FOR RE-ACCESSIONS, COMPLETE #7 THRU #9)

| | | | |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| 1 | Does this project require special handling according to NEESA Levels C, D, AFOEHL or CLP protocols? If yes, complete a) thru c) a) Cooler temperature _____ b) pH sample aliquoted: yes / no / n/a c) LOT #'s: _____ | YES | <u>NO</u> |
| 2 | Are custody seals present on cooler? If yes, are seals intact? | YES | <u>NO</u> |
| | | YES | NO |
| 3 | Are custody seals present on sample containers? If yes, are seals intact? | YES | <u>NO</u> |
| | | YES | NO |
| 4 | Is there a Chain-Of-Custody (COC)? | <u>YES</u> | NO |
| 5 | Is the COC* complete? Relinquished: <u>yes/no</u> Requested analysis: <u>yes/no</u> | <u>YES</u> | NO |
| 6 | Is the COC* in agreement with the samples received? # Samples: <u>yes/no</u> Sample ID's: <u>yes/no</u> Matrix: <u>yes/no</u> # containers: <u>yes/no</u> | <u>YES</u> | NO |
| 7 | Are the samples preserved correctly? | <u>YES</u> | NO |
| 8 | Is there enough sample for all the requested analyses? | <u>YES</u> | NO |
| 9 | Are all samples within holding times for the requested analyses? | YES | <u>NO</u> |
| 10 | Were the samples received cold? | <u>YES</u> | NO |
| 11 | Were all sample containers received intact (ie. not broken, leaking, etc.)? | YES | NO |
| 12 | Are samples requiring no headspace, headspace free? <u>N/A</u> | YES | NO |
| 13 | Are there special comments on the Chain of Custody which require client contact? | YES | <u>N/A</u> |
| 14 | If yes, was ATI Project Manager notified? | YES | NO |

Describe "no" items: SAMPLES ARRIVED AT 21.5°C. (No ice)

Was client contacted? yes / no

If yes, Date: _____ Name of Person contacted: _____

Describe actions taken or client instructions: _____

*Or other representative documents, letters, and/or shipping memos

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1.1 PURPOSE

Woodward-Clyde Consultants (WCC) was retained by the City of Oakland to conduct a site characterization at the Verdesse Carter Park site in Oakland, California. The site characterization generally consisted of a sampling and analysis program for the shallow soil zone beneath the site. Recent observations at the Park have raised concerns that lead or other chemicals possibly remaining in soils may present environmental and health threats. In March of 1993, citizens reported observing a yellow-white precipitate substance in cracks in the asphalt basketball court area.

In April 1993, because of recent, heightened concerns regarding apparent or suspected conditions at the park, the city requested WCC to plan and initiate an investigation of potential soil contamination at the park. This investigation was comprehensive in that it addressed the entire park area, and not just the portion formerly occupied by the battery factory.

The scope of work was conducted for the City Attorney in accordance with our proposals of May 19 and June 21, 1993 as subsequently approved and modified.

1.2 PROJECT BACKGROUND

1.2.1 Site History

Verdesse Carter Park (the park) is located in Oakland, California between 98th and 96th Avenues, and Bancroft Avenue and Sunnyside Street. The park covers approximately 3 acres. Low knolls, up to about 6 feet high, of grass-covered and tree-planted fill generally line the north, east, and southern perimeters of the park. The south side of the park is bordered by a gravel covered, undeveloped strip of land approximately 40 feet wide along the 98th Avenue frontage.

The park currently consists of a grassy field area on the southern side of the park, while the northern side of the park contains two basketball courts, a children's sandbox/playground area, and a community center/maintenance structure. The general layout of the park is presented on Figure 1.

The southern half of Verdesse Carter Park, i.e., fronting on 98th Avenue, was occupied by a wet cell battery factory from at least 1912 (the date of the earliest Sanborn Map of the site) until it was demolished in 1977 for construction of the park. Soil contaminants typically associated with wet cell battery manufacturing include acids, sulphur, lead, and to a lesser extent, other metals such as arsenic and zinc.

Aerial photos indicate that the factory ceased operations sometime between 1973 and 1975. For most of its operational life, the factory completely occupied the south half of the block, most of the footprint of the factory being located on a concrete slab floor. Sanborn maps and aerial photos show a variety of operation areas of the factory, including offices along the 98th Avenue frontage, loading facilities including a rail spur along Bancroft Avenue, sulfuric acid aboveground storage tanks at various locations but concentrated near the northeast corner of the factory area along Bancroft Avenue, and drum storage areas along the north border of the property, i.e., midway through the present park site.

The northern half of the park, i.e., fronting on 96th Avenue, was occupied by a commercial greenhouse nursery from at least 1912 until sometime between 1968 and 1973, according to aerial photos. Other greenhouse nurseries were also located in the neighborhood. Reportedly, the nursery operations at the park site were devoted to raising roses, and did not use pesticides other than nicotine. Soil contaminants that may be associated with commercial nursery operations include pesticides, herbicides, and fertilizer components, including associated component metals such as arsenic and zinc, and sulphur. A 1973 aerial photo of the site after the greenhouses were removed, shows drum storage surface scars on the ground near the battery factory area. This and the presence of parked automobiles on the former nursery area near the battery factory fence suggests that portions of the nursery area may have been used for activities related to the battery factory after the nursery ceased operation.

Construction plans for the park indicate that the landscaped knolls were to be built at least partially by cut and fill earthwork on the site, i.e., by excavating soil from one part of the site

and disposing it at another. The grading plans and specifications indicate that reuse onsite of strongly acidic, yellow stained soil underlying the battery factory was not allowed unless buried at depth to protect plant growth.

Several soil sampling and analysis programs were performed at the former battery factory area in the 1970's to determine concentrations of lead in soil. Sampling was conducted by the City of Oakland (City), Alameda County Health Department (County), the California Department of Health Services (DHS), the University of California at Berkeley (UC), and by a private concerned citizens group. Elevated lead concentrations were measured in shallow soil samples collected in 1978 prior to the removal of contaminated soil discussed below. The approximate locations of these sampling activities are shown on Plate 1.

The City of Oakland (City) acquired the two adjacent properties circa 1975 and converted the site to a park in 1978. After acquisition of the land now occupied by the Park the City reportedly removed several thousand cubic yards of lead-contaminated soil from the site. In 1978, under the supervision of DHS and the County, approximately 1,700 yards of lead-contaminated soils located previously beneath the floor slab of the battery factory were reportedly removed to a depth of 12 inches, and replaced with 18 inches of clean soil. The approximate reported limits of the 1978 removal are indicated on Plate 1.

Recent observations at the Park have raised concerns that lead or other chemicals possibly remaining in soils may present environmental and health threats. In March of 1993, citizens reported observing a yellow-white precipitate substance in cracks in the asphalt basketball court area.

1.2.2 Scope of Site Characterization

The site characterization activities were performed to provide a more complete characterization of potential contamination in soils at Verdese Carter Park. Specific objectives of this investigation included:

- Investigate potentially elevated metals and acid concentrations in shallow soils and, if elevated metals concentrations are observed, initially define the vertical and lateral extent of contamination and apparent causes.

- Provide a screening-level investigation of shallow native soils for pesticides and herbicides, based on historic usage of the western portion of the site as a nursery.

1.3 REPORT ORGANIZATION

Section 2 of this report describes the site characterization activities that were conducted for this investigation, including site history research, and initial and supplemental soil sampling and analysis programs. Section 3 describes the physical characteristics of the site, including geotechnical characteristics relevant to this investigation. Section 4 discusses the nature and extent of contamination, including estimation of background concentrations, and a summary of the analytical data quality assurance/quality control (QA/QC) review. Section 5 presents a brief summary of the contaminant fate and transport characteristics of the site. Section 6 presents conclusions and recommendations including a summary of planned remedial activities.

SITE CHARACTERIZATION ACTIVITIES

2.1 SITE HISTORY RESEARCH

The site history research included review of City files regarding the construction and operation of the park, including design plans, review of archived aerial photos possessed by Pacific Aerial Surveys in Oakland, and review of historic Sanborn map data at the Bancroft Library, University of California at Berkeley, and from City sources.

2.2 INITIAL SOIL INVESTIGATION

The initial soil investigation was conducted in substantial accordance with the "Initial Soil Investigation Work Plan," dated April 29, 1993 and subsequently reviewed and approved by the Alameda County Department of Environmental Health (ACDEH).

For the purposes of this investigation, the park was divided into two areas, as indicated on Figure 1. The areas are distinguished from each other based primarily on historical usage and, consequently, potential contaminants of concern.

The southern portion of the park was the former site of a wet-cell battery factory and is referred to as the 'Battery Factory Area'. Potential contaminants/parameters of concern in this area included metals and pH.

The northern portion of the park is the site of a former nursery, and was referred to as the 'Nursery Area'. Potential contaminants/parameters of concern in this area included metals and pH (as a result of proximity to the former battery factory), pesticides and herbicides (the latter two potentially resulting from activities at the former nursery).

Twelve soil borings were advanced in the Nursery Area as shown on Figure 1. While some of the proposed boring locations within the Nursery Area were selected to provide general area coverage, WCB-2, -3, -5, and -9 were located in the area where a precipitate-like substance was observed in cracks in the basketball court pavement. WCB-6 and -7 were

specifically located in the sandbox area; a high use area for children. These two sampling locations were chosen because children are particularly sensitive potential receptors for contaminants, and the area may also serve as a collection point for possible upwelling or "wicking" of subsurface contamination due to the sandbox area's reportedly poor drainage.

Eight soil borings were advanced in the Battery Factory Area as shown on Figure 1. The boring locations within the Battery Factory Area, i.e., WCB-13 through -20, were selected in consideration of past and current site use, the results of previous sampling, and to provide appropriate area coverage. In terms of area coverage, the boring locations were biased away from the frontage along 98th Avenue, as Sanborn Map data shows that this area was occupied by "low-threat" office areas of the battery factory. The specific rationale for individual boring locations was:

- WCB-13 located in the barbecue area, a high-use area of the park for potential human receptors;
- WCB-14 located in an area that Sanborn Map data indicates as being formerly occupied by aboveground acid storage tanks, and located near homeplate at the baseball diamond, a high use area of the park for potential human receptors;
- WCB-16 located where previous surface soil sampling detected a total lead concentration of 96,000 mg/kg, the highest ever detected at the site. The sampled soil was later removed, but this boring was proposed to confirm that the 1978 excavation was sufficiently deep; and
- WCB-15 located to provide general area coverage.
- WCB-17 to 20 located to provide general area coverage.

Soil samples were collected from each boring at one depth within the fill material and at the following depth intervals beneath the fill soil placed for development of the park: 0.5-1.0 ft, 2.0-2.5 ft, 5.0-5.5 ft, 7.0-7.5 ft, and 10.0-10.5 ft.

The 20 soil borings for the initial soil investigation were advanced between May 10 and May 14, 1993 using a truck-mounted drill rig operated by HEW Drilling of East Palo Alto, California under the observation of a WCC geologist. A total of 173 soil samples were collected from the twenty soil borings for possible chemical analysis. Soil samples were

collected using a 2-inch I.D. split-spoon sampler with clean stainless-steel or brass sample tubes for analytical testing and preparation of a detailed log of each boring. Logs of the borings are presented in Appendix A.

All drilling and sampling equipment was cleaned with a hot pressure washer between each boring. Sampling equipment was cleaned between sample drives with analconox detergent wash, double rinsed in tap water, then double rinsed with deionized water to reduce the potential for cross-contamination. Soil samples collected for chemical analysis within the sample tubes were sealed with Teflon and plastic endcaps, labeled, placed on ice and transported under chain of custody procedures, via Federal Express, to CKY Laboratories in Torrance, California. CKY is a California certified analytical laboratory. Soil cuttings from each boring and decontamination wash water were placed in DOT approved 55-gallon drums, labeled and stored at the site for later disposal. At the completion of each boring advancement, the boring was backfilled with a cement bentonite grout mixture.

The samples from borings located in the former nursery area of the site (Borings WCB-1 through -12) that were obtained approximately 6 inches beneath the transition between the park fill and pre-park soil were analyzed for a wide range of pesticides and herbicides. This was to provide a screening-level assessment of potential contamination related to previous commercial nursery operations. One sample from each boring was analyzed by EPA Methods 8080, 8140, and 8150.

Possible metals contamination was the primary concern of this investigation. CAM 17 metals scans (also commonly called Title 22 or TTLC metals scans) by EPA Methods 6010/7000 series were performed during the initial soil investigation on samples collected approximately 6 inches below the transition between the park fill and underlying pre-park soil. One such sample from each boring was analyzed to provide a screening-level identification of specific metals for further investigation as contaminants of concern. The only metals that appeared to have significantly elevated concentrations in the screening-level assessment phase of the initial soil investigation were arsenic, lead, and zinc. On this basis lead and zinc, and to a somewhat lesser degree arsenic were the focus of subsequent analysis of the remaining soil samples obtained from each boring. Selected samples of soil were analyzed for pH by EPA Method 9045.

2.3 SUPPLEMENTAL SOIL INVESTIGATION

The supplemental investigation included installation and sampling of six additional borings in the vicinity of Borings WCB-13 and -14, the selective removal of asphalt at the play court area, sampling of the underlying aggregate base material, and sampling of the precipitate-like substance found in some of the pavement cracks.

The supplemental soil borings, WCB-21 through -26 were installed to better delineate the extent of soil contamination encountered in Borings WCB-13 and -14. The six supplemental borings were installed on July 24, 1993 using a truck-mounted auger drilling rig operated by Great Sierra Exploration of Novato, California, under the supervision of a WCC geologist. Samples of soil were obtained at depths of approximately 0.5, 2, 5, and 7 feet beneath the bottom of the imported topsoil layer, aggregate base material, or imported soil backfill used in the 1978 removal action, whichever was appropriate for the particular boring location. The design grading plans for the park construction and lithology encountered during the initial soil investigation program were consulted to guide the field sampling. The soil samples were forwarded to CKY Laboratory for analysis for lead and zinc by Method 6010, arsenic by GFAA, and pH by Method 9045.

The selective removal of pavement was performed by WCC personnel on June 28, 1993. The purpose was to expose more of the precipitate-like substance in some of the pavement cracks and the soil staining observed in the aggregate base material penetrated by soil borings in pavement areas. A grab sample (Court 1) of the aggregate base material was obtained that day and forwarded to ATI Laboratory in San Diego, a California certified laboratory for a wide range of analyses. On July 8, a composite sample of the aggregate base material (Court 2) and of the precipitate substance (Crack 1) from various locations at the play court area was obtained and forwarded to ATI for a variety of total and soluble metals analyses. The location of aggregate base samples Court 1 and 2 are shown on Figure 1. The location of precipitate sample Crack 1 is shown on Figure 2.

On July 30, nine discrete samples (8 primary and one duplicate) of the precipitate substance were collected from locations widely distributed over the play court area. The locations of these precipitate samples are shown on Figure 2. The samples were submitted to ATI for analysis of pH, sulfide, sulfate, arsenic, lead, and zinc.

PHYSICAL SITE CHARACTERISTICS

3.1 PRESENT SITE DEVELOPMENT

The park covers approximately 3 acres. Low knolls, up to about 6 feet high, of grass-covered and tree-planted fill generally line the north, east, and southern perimeters of the park. The south side of the park is bordered by a gravel covered, undeveloped strip of land approximately 40 feet wide along the 98th Avenue frontage.

The park currently consists of a grassy field area on the southern side of the park, while the northern side of the park contains two basketball courts, a children's sandbox/playground area, and a community center/maintenance structure. The general layout of the park is presented on Figure 1.

3.2 SOILS

The general subsurface conditions encountered in the borings within the former battery factory area consists of 3-inch thick lawn, underlain by 6 to 12 inches of clayey silt topsoil fill, which is underlain by 2 to 4 feet of dark brown to black gravelly clay fill containing wood and red brick debris fragments. The gravelly clay fill is underlain by 3 to 15 feet of brown to grayish olive brown, stiff silty clay that is interlayered with sandy clays and sandy silty clays.

The general surface/subsurface conditions encountered in the borings within the former nursery area consisted of either 3-inch thick lawn and associated 0.5 to 3 feet of clayey silt topsoil, or 2-inch thick asphalt underlain by approximately 4 inches of silty, sandy gravel aggregate base rock fill within the basketball courts area. The clayey silt topsoil and the gravel aggregate base rock are underlain by up to 3 feet of dark brown to black gravelly clay fill containing wood and brick debris. The gravelly clay fill is underlain in mound areas by 2 to 7 feet of very dark brown to black stiff silty clay fill containing broken glass and wood debris. The gravelly clay fill in the basketball and asphalt walkway areas is underlain by 1 to 2 feet of very dark gray to dark brown silty clay fill containing brick and concrete debris.

The two fill units in the former nursery area are underlain by 4 to 10 feet of brown to olive brown, stiff silty clay that is interlayered with sandy clays and sandy silty clays. This interlayered silty clay is underlain by 1 to 2 feet of yellowish brown to light yellowish brown stiff gravelly clay, which is underlain by up to 3 feet of light brown, moist gravelly clayey sand. The gravelly clayey sand is underlain at depth by a light yellow brown, stiff silty clay.

The aggregate base material underneath the play courts and path pavements consists of rhyolite rock fragments and residual silt. This material is a distinctive yellow color, but the internal color of the larger rock fragments is an even gray. Rhyolite is a volcanic rock common in the East Bay hills.

No visible contamination was observed in any of the borings in the former battery factory area and any of the borings in the former nursery area except borings except the distinctive yellow color of the aggregate base material.

3.3 GROUNDWATER

Groundwater was not a subject of this investigation. Groundwater was not encountered in any of the borings installed for this investigation. Reportedly, groundwater in the area is encountered at a depth of approximately 30 feet.

NATURE AND EXTENT OF CONTAMINATION

This section presents the results of contaminant characterization activities. It includes a discussion of the analytical data by contaminant or parameter type, the degree of contamination and its distribution across the site. This section also contains a summary of the analytical data quality assurance/quality control (QA/QC) review, estimated background levels, and discusses correlations between the data.

4.1 BACKGROUND LEVELS ESTIMATION

"Background" soil parameters or concentration levels can be defined two ways: levels due to the natural geologic composition of the soil, and levels including those due to human-related activity but not related to operations or activities specific to the site being studied. The first definition is often referred to a "natural" background and the second as "anthropogenic" background. As an example of natural background, soil naturally contains various metals such as arsenic, lead, and zinc. The concentrations of each individual metal will depend on the particular soil type. As an example of anthropogenic background, surficial and shallow soils in urban areas and near roads often contain relatively high concentrations of lead due in part to past air pollution from leaded gasoline.

Assessment of background concentrations for this investigation did not include collection of samples from off site. In part, this was due to the knowledge that a previous investigation by DHS in 1978 (see Plate 1) found high levels of lead in shallow soils at locations across the street from the park. These elevated concentrations of level could have been due to a variety of causes not necessarily related to the site and would be an unacceptable source of uncertainty if included in an anthropogenic background evaluation. Instead, the assessment of background levels relied on samples obtained from the site but at apparently uncontaminated locations.

The range of natural background levels was estimated by a semi-qualitative review of the distribution of the analytical results, review of literature regarding soil metals concentrations in the general region of the Bay Area and northern California, and by previous WCC

experience at other similar sites. The background level estimation did not employ geostatistical methods. This will be done in the near future and may require the analysis of additional samples. The natural background levels estimated are described below for arsenic, lead, zinc, and pH.

4.2 QA/QC REVIEW SUMMARY

An extensive Quality Assurance/Quality Control (QA/QC) review was performed of the analytical data. The results of the review are presented in Appendix B. The review concluded that the data is of acceptable analytical accuracy and precision, with some limitations of the utility of the metals data due to inherent contaminant stratification and soil matrix heterogeneity.

4.3 PESTICIDES AND HERBICIDES

Samples from borings located in the former nursery area of the site (Borings WCB-1 through -12) were obtained approximately 6 inches beneath the transition between fill soil that was placed to develop the park and the underlying pre-park soil. These samples were analyzed for a wide range of pesticides and herbicides. This was to provide a screening-level assessment of potential contamination related to previous commercial nursery operations. One sample from each boring was analyzed by EPA Methods 8080, 8140, and 8150.

No pesticides or herbicides were detected.

4.4 METALS

Possible metals contamination was the primary concern of this investigation. CAM 17 metals scans (also commonly called Title 22 or TTLC metals scans) by EPA Methods 6010/7000 series were performed during the initial soil investigation on samples collected approximately 6 inches below the transition between the park fill and underlying pre-park soil. One sample from each boring was analyzed to provide a screening-level identification of specific metals for further investigation as contaminants of concern. Also, two grab samples of the aggregate base material beneath the play courts collected during the supplemental soil investigation (samples Court-1 and -2) were analyzed for CAM 17 metals.

The results of the metals scans are presented in Table 1. The only metals that appeared to have significantly elevated concentrations, i.e., significantly above background, in the screening-level assessment phase of the initial soil investigation were arsenic, lead, and zinc. On this basis lead and zinc, and to a somewhat lesser degree arsenic, were the focus of subsequent analysis of the remaining soil samples obtained from each boring. Arsenic, lead, and zinc were the only metals analyzed from the "hot spot delineation" borings (WCB-21 through -26) of the supplemental soil investigation. The results of the arsenic, lead, and zinc analyses are presented in Table 2, and are discussed below. Some key concepts regarding the nature and extent of contamination are illustrated in the figures and are also discussed below.

4.4.1 Arsenic

Soil samples were analyzed for arsenic by the GFAA method. The results of the arsenic analyses are summarized on Table 2. Natural background for arsenic was estimated to range up to approximately 10 mg/kg. Arsenic concentrations in soil samples above this estimated background level are graphically presented on Figure 2.

Highly elevated arsenic concentrations, typically on the order of 400 to 500 mg/kg were found in the imported aggregate base material beneath the asphalt pavement of play courts and pathways. The arsenic levels in the underlying soil generally decrease to near background levels within 6 to 12 inches beneath the bottom of the aggregate base layer. The slightly elevated arsenic concentration in the pre-park soil beneath the sandbox at WCB-7 (12 mg/kg at a depth of 18 inches) may be due to leachable arsenic in water runoff from the aggregate base material into the sandbox, the possible presence of this aggregate base material in subdrains beneath the sandbox, or may be an isolated occurrence. Arsenic concentrations in this boring returned to background levels within a depth of 3 feet. Elevated arsenic levels are a secondary contaminant at the lead "hot spot" around WCB-13, which appears to be associated with the former battery factory. Elevated arsenic concentrations in this area appear to be limited to a depth of 3 feet or less. The elevated arsenic concentration of 27 mg/kg at a depth of 18 inches WCB-11 appears to be an isolated occurrence.

The precipitate-like substance found in pavement cracks contains elevated concentrations of arsenic (sample concentrations of 7 mg/kg to 33 mg/kg) but at concentrations significantly below those found in the underlying aggregate base.

The California non-RCRA criteria for definition of hazardous waste for disposal purposes based on total metal concentration is the Total Threshold Limit Concentration (TTLC) contained in CCR Title 22. The TTLC criteria for arsenic is 500 mg/kg. Of all the samples obtained during this investigation, only the aggregate base material contained arsenic concentrations close to or exceeding the TTLC. Samples of the aggregate base material were generally in the range of 400 to 500 mg/kg with a highest sample concentration of 734 mg/kg. On this basis, it appears that the aggregate base material likely exceeds TTLC criteria overall.

Soluble Arsenic

A sample of the aggregate base material (sample Court-2) was analyzed for soluble arsenic using the WET test for comparison to California CCR Title 22 Soluble Threshold Limit Concentration (STLC) criteria for identification of hazardous waste for disposal purposes. The soluble arsenic concentration in the aggregate base material by this test was 8.8 mg/L, above the STLC soluble arsenic criteria of 5 mg/L.

A Toxicity Characteristic Leaching Procedure (TCLP) test for soluble arsenic for comparison to federal RCRA classification of hazardous waste for disposal was not performed during this phase of the investigation.

A modified WET test of sample Court-2 using deionized water was also performed to more realistically assess the in-place or in situ leachability of arsenic due to rainfall and watering of the adjacent lawn areas of the park. The soluble arsenic concentration was significantly less (less than 0.05 mg/L).

4.4.2 Lead

Soil samples were analyzed for lead by EPA Method 6010. The results of the lead analyses are summarized on Table 2. Natural background for lead was estimated to range up to

40 mg/kg. Based on the site's location in a highly urban area and next to major thoroughfares, i.e., Bancroft and 98th Avenues it was anticipated that anthropogenic background lead levels in surface soil could be significantly higher. For this reason, "elevated" concentrations of lead for this investigation were defined as 100 mg/kg or higher.

Highly elevated lead concentrations were encountered beneath some of the landscape knolls, e.g., in the vicinity of Boring WCB-13. At other knolls no elevated lead concentrations were encountered, e.g., at WCB-10.

At the knoll in the vicinity of WCB-13 and WCB-23, along Bancroft Avenue in the general area of the former battery factory, the extent of contamination appears to include the entire knoll. Lead concentrations as high as 6,700 mg/kg were encountered, and were generally higher than the TTLC for lead of 1,000 mg/kg. The depth of contamination in this area ranges from 1 foot to approximately 6 feet beneath the ground surface, and includes the park fill material used to build up the knoll and also extends into the pre-park soil zone underneath.

Boring WCB-15 at another knoll in the former battery factory area also encountered elevated lead, 1,520 mg/kg at a depth of 2 feet but not deeper than 3 feet. This high lead concentration was in the park fill material. Lead concentrations at this location were not elevated in the pre-park soil underneath. It is not possible on the basis of a single boring to assess whether the contamination encountered at this location encompasses the entire knoll.

Significantly elevated lead concentrations were also encountered in one knoll in the former nursery area, i.e., not within the battery factory area. Here, WCB-12 encountered elevated lead concentrations as high as 502 mg/kg at a depth of 4.5 feet in the park fill. WCB-11, also located on this knoll, but behind the building, did not encounter elevated lead concentrations.

Elevated lead concentrations were also encountered in the aggregate base material beneath the play courts and asphalt pathways. Lead concentrations in this material were generally in the range of 400 to 600 mg/kg, with a highest measured concentration of 734 mg/kg in sample Court-2. Overall, the lead levels in the aggregate base material approach but do not

exceed the TTLC. The depth of significant contamination in the underlying soil appears to be limited to a depth of less 6 to 12 inches beneath the bottom of the base material.

The precipitate-like substance found in the pavement cracks does not contain significant concentrations of lead (sample concentrations of 6 mg/kg to 35 mg/kg).

Soluble Lead

A sample of the aggregate base material (sample Court-2) was analyzed for soluble lead using the WET test for comparison to the STLC criteria for soluble lead for classification of hazardous waste for disposal purposes. The soluble lead concentration in the aggregate base material by this test was 0.4 mg/L, well below the STLC criteria of 5 mg/L.

A TCLP test for soluble lead for comparison to federal RCRA criteria for classification of hazardous waste for disposal was not performed during this phase of the investigation, but given the results of the WET test, would probably not exceed the RCRA criteria for lead of 5 mg/l.

A modified WET test of sample Court-2 using deionized water was also performed to more realistically assess the in-place or insitu leachability of lead due to rainfall and watering of the adjacent lawn areas of the park. The soluble lead concentration was much less; less than 0.03 mg/L.

4.4.3 Zinc

Soil samples were analyzed for zinc by EPA Method 6010. The results of the zinc analyses are summarized on Table 2. Natural background for zinc was estimated to range up to 80 mg/kg.

Slightly elevated zinc concentrations up to approximately 150 mg/kg were encountered in some of the park fill soil in the knolls and in the pre-park soil in the former battery factory area. A markedly higher zinc concentration of 515 mg/kg was detected at a depth of one foot in the pre-park soil at WCB-13.

Higher zinc concentrations were encountered in the aggregate base material beneath the play courts and asphalt pathways and in the underlying soil up to a depth of 18 inches to 3 feet. Zinc concentrations in the aggregate base and underlying soil were generally in the range of 300 to 600 mg/kg. The depth of significant contamination appears to be limited to a depth of 18 inches to 3 feet beneath the bottom of the base material.

The precipitate-like substance found in some of the pavement cracks contains high levels of zinc generally in the range of 6,000 to 8,000 mg/kg.

With the exception of the precipitate, none of the samples contained zinc concentrations exceeding the TTLC for zinc of 5,000 mg/kg.

Soluble Zinc

Since none of the soil and aggregate base material samples contained total zinc concentrations close to or exceeding a level 10 times the nominal STLC for zinc of 250 mg/l, it is unlikely that these materials contain WET soluble zinc exceeding the STLC criteria.

A sample of the aggregate base material (sample Court-2) was analyzed for soluble zinc using the WET test and a modified WET test using deionized water to assess the insitu leachability of zinc due to rainfall and watering of the adjacent lawn areas of the park. The soluble zinc concentration by the WET test was 4.1 mg/L. The soluble zinc concentration using deionized water, supposedly a much less aggressive leaching procedure, was not significantly less (3.3 mg/L).

4.5 pH

Selected samples of soil were analyzed for pH by EPA Method 9045. A summary of the pH results are presented on Table 2. Background or natural soil pH was estimated to range approximately between about 6 and 8.5. pH was included as an analytical parameter for several reasons:

- to identify possible acids contaminated soil that might pose a health or environmental threat;

- to distinguish between different sources of soil metals contamination on the basis of their characteristic correlation with pH; and
- as a relatively inexpensive screening-level parameter indicating possible metals contamination associated with acid, e.g., battery acid.

The pH of the precipitate material in the pavement cracks was very low i.e., acidic, with measured pHs as low as 1.4 and generally below 2. The regulatory hazardous criteria for corrosivity for transport and disposal is pH 2 or below.

The pH of the aggregate base material and immediately underlying soil was generally 3 to 3.5, i.e., acidic, with pHs ranging from 2.8 in sample Court-2 to 4.1 in sample B24-1.

The pH of the other fill and native soil units at the park was generally within the apparent background range, with a few sample measurements well into the basic range (sample B14-3 with a pH of 11 and sample B16-1 with a pH of 9.5) and acidic range (B19-2 at pH 3.7, B19-4 at pH 4.1, and B22-4 at pH 3.6). The cause of the basic or high pH is suspected to be due to the presence of concrete debris in the fill material.

4.6 DATA CORRELATIONS

The aggregate base material is typified by the joint presence of significantly elevated concentrations of arsenic, lead, and zinc, and low pH in the 3 to 4 range. Soil beneath this material that appears to be impacted by leaching is generally typified by significantly elevated zinc and low pH in the 3.5 to 5 range, although not by significantly elevated arsenic and lead concentrations except in very close proximity to the base material.

Contamination in the pre-park soil in the former battery factory area is typified by elevated lead concentrations with zinc and sometimes arsenic as distant secondary contaminants. The same is true of contaminated park fill material in the knolls across the park. This fill material in the knolls is also geotechnically similar to the identified pre-park soil consisting of an older fill unit pre-dating the battery factory or nursery.

With the exception of the aggregate base material and impacted underlying soil, pH does not correlate well with arsenic, lead, or zinc concentrations.

4.7 GENERAL CONTAMINATION DISTRIBUTION

There appear to be three distinct types or general patterns of contamination at the site. The first pattern is attributable to the aggregate base material beneath the play courts and pathways in the north half of the park. This material, which has tentatively been identified as a mixture of rhyolite rock fragments and residual silt, is distinctively yellow in color, is highly acidic, and contains significantly elevated concentrations of arsenic and lead, and to a lesser extent, zinc. This material preferentially leaches zinc and acid relative to arsenic and lead. The depth of lead and arsenic contamination in the underlying soil is generally limited to a depth of 6 to 12 inches, while the depth of zinc contamination is between 18 inches and 3 feet. The precipitate substance found in some of the pavement cracks is derived from this material, and is itself distinctively yellow, very acidic, and contains very high concentrations of zinc but low concentrations of arsenic and lead.

The second pattern is lead contaminated soil in the fill material used to construct some of the landscaped knolls. Its contaminant profile and geotechnical characteristics are the same as the pre-park soil zone (the intact older fill unit) encountered beneath the former battery factory area. This suggests that the knolls were developed at least in part by "cut and fill" earthwork from the former battery factory area during grading construction of the park. The contaminated soil within the knolls is covered by at least the 6 inches of clean topsoil placed to support lawn growth.

The third pattern is lead contamination in the pre-park soil zone along a portion of Bancroft Avenue under the former battery factory area. This area corresponds to the former location of aboveground acid tanks and railroad spur noted in historic Sanborn maps and aerial photos. This area is now occupied by the knoll in the vicinity of Borings WCB-13, -14, -22, and -23, and apparently was not included in the 1978 soil removal activities. The contamination here is typified by elevated lead, slightly elevated arsenic and zinc, and normal soil pH. The extent of contamination below the park fill and pre-park soil interface is apparently only a few feet.

CONTAMINANT FATE AND TRANSPORT

Migration routes for the contamination in the soil beneath the eastern portion of the former battery factory area, in some of the knolls across the site, and within and underneath the aggregate base material include downward leaching of contamination dissolved in surface water through the soil column and potential resultant groundwater contamination and migration. Windborne migration and casual, direct human ingestion of contamination in the factory area and knolls is eased by the presence of 6 inches or more of clean, imported topsoil material. Although eased by the presence of the overlying asphalt pavement, windborne migration and direct human ingestion of the contaminated aggregate base material are potential migration routes through the crystalline material in some of the pavement cracks. This crystalline material is derived from the aggregate base material.

Metals contamination is not significantly degraded by sunlight or microorganism biodegradation.

In a typical soil environment, most metals generally are not mobile (they do not significantly dissolve or evaporate). Lead is a particularly immobile metal, however, the mobility of most metals is increased in an acidic environment, such as that found in the aggregate base material. The soil contamination information from this site suggest that metals contamination associated with the aggregate base material has not moved deeper than one to three feet for zinc, and less than two feet for arsenic and lead. This movement appears to be similar for the lead contamination associated with the knolls and the former battery factory area

CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY OF FINDINGS

There appear to be three distinct types or general patterns of soil contamination at the site. The first is attributable to the aggregate base material beneath the play courts and pathways in the north half of the park. This material, which has tentatively been identified as a mixture of rhyolite rock fragments and residual silt, is distinctively yellow in color, is highly acidic, and contains significantly elevated concentrations of arsenic and lead, and to a lesser extent, zinc. This material preferentially leaches zinc and acid relative to arsenic and lead. The depth of lead and arsenic contamination in the underlying soil is generally limited to a depth of 6 to 12 inches, while the depth of zinc contamination is between 18 inches and 3 feet. The precipitate substance found in some of the pavement cracks is derived from this material, and is itself distinctively white to yellow, very acidic, and contains relatively much high concentrations of zinc but low concentrations of arsenic and lead.

The second is lead contaminated soil in the fill material used to construct some of the landscaped knolls in the park. Its contaminant profile and geotechnical characteristics are the same as the pre-park soil zone encountered beneath the former battery factory area. Based on the similar geotechnical and contaminant characteristics, and the park construction plans detailing planned earthwork, we conclude that at least some of the fill material in the knolls was derived from excavation of the soils from beneath the former battery factory. Since the lead levels measured do not correlate with soil staining or notably low pH, possible soil classification and segregation activities during park construction based on soil staining or pH monitoring would have been ineffective in detecting lead contamination of the levels encountered during this investigation.

Finally, the third is lead contaminated soil beneath (rather than within) the existing knolls in the former battery factory area. This contamination appears to be concentrated in a portion of the former battery factory area along Bancroft Avenue that was occupied by aboveground acid storage tanks and a railroad loading spur. These area was apparently not included in the 1978 soil removal activities. The contamination here is typified by elevated lead, generally

slightly elevated arsenic and zinc, and normal soil pH. The extent of contamination below the parkfill and pre-park soil interface is usually only a few feet. The contaminated soil within the knolls is covered by at least the 6 inches of clean topsoil placed to support lawn growth.

6.2 RECOMMENDATIONS FOR ADDITIONAL INVESTIGATION ACTIVITIES

Recommendations for additional investigations include:

- A geostatistical evaluation of background levels of arsenic, lead, and zinc at the site. This may require additional soil sample analyses.
- investigation of past and current quarry and mining operations in rhyolite formations in the area to identify likely sources of the aggregate base material.
- TCLP and/or WET solubility testing of the "hot spot" soil contamination to identify state and federal hazardous waste classification for disposal and pretreatment, if required.
- Solubility testing of "moderate" contamination levels not presenting a human health threat and associated in situ leachability evaluations to estimate contaminant concentration thresholds below which contaminated soil may be left in place and be protective of environmental concerns i.e., groundwater quality.
- Additional delineation of the lateral and vertical extent of lead contamination encountered in the knoll at WCB-15. This may most efficiently be done immediately prior to or concurrent with the planned excavation and offsite disposal activities (see below).

6.3 PLANNED REMEDIAL ACTIVITIES

The planned remedial activities are the excavation and offsite disposal of the aggregate base material under pathways and play courts, the overlaying asphalt pavement, and underlying soil containing arsenic or lead concentrations exceeding the cleanup criteria. Lead

contaminated soil exceeding the cleanup criteria will also be removed from the landscaped knolls at the park. The soil removal from the knoll along Bancroft Avenue in the vicinity of Borings WCB-13 and -22 will extend beneath the knoll to reach the contamination under the aboveground storage tank and loading spur area of the former battery factory. At this time, the assumed cleanup criteria for shallow soils will be 200 mg/kg for lead and 20 mg/kg for arsenic. The project cleanup criteria will be finalized before the remedial activities are completed.

The remedial excavation will employ dust suppression measures, e.g., water sprays, and the City will set up air monitoring stations around the park to measure any potential dust emissions from the excavation and earthworking.

Sufficient removal of contaminated soil will be confirmed by soil sampling of the bottom of the excavations.

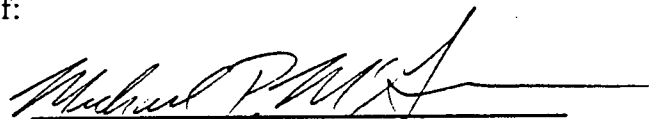
LIMITATIONS AND CERTIFICATION

The findings, recommendations, specifications, or professional opinions are presented, within the limits prescribed by the client, after being prepared in accordance with generally accepted engineering practice in Northern California at the time this investigation was performed. No other warranty is either expressed or implied.

CERTIFICATION

This report was prepared under the supervision of:

Signature:



Name:

Michael P. McGuire, P.E.

Title:

Project Engineer

Professional License Number: Registered Civil Engineer No. 42565



Table 1. Summary of Soil Results for pH and CAM 17 Metals (mg/kg).

| Sample | pH | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Copper | Lead | Mercury | Molybdenum | Nickel | Selenium | Silver | Thallium | Vanadium | Zinc |
|---------|------|----------|---------|--------|-----------|---------|----------|--------|--------|------|---------|------------|--------|----------|--------|----------|----------|------|
| TTL | | 500 | 500 | 1000 | 75 | 100 | 2500 | 8000 | 2500 | 1000 | 20 | 3500 | 2000 | 100 | 500 | 700 | 2400 | 5000 |
| B-01-3 | 7.29 | <15 | 5.09 | 194 | <0.75 | <1 | 44.6 | 8.31 | 25.4 | 88.7 | 0.1 | <2.5 | 34 | <15 | <1 | <20 | 56.8 | 72.3 |
| B-02-1 | 6.26 | <15 | 5.3 | 279 | <0.75 | <1 | 62.6 | 10.3 | 27 | 11.9 | 0.11 | <2.5 | 51.7 | <15 | <1 | <20 | 68.3 | 621 |
| B-03-1 | 3.87 | <15 | 18.8 | 224 | <0.75 | <1 | 59.1 | 4.78 | 78.3 | 13.2 | <0.05 | <2.5 | 30.6 | <15 | <1 | <20 | 67.2 | 299 |
| B-03-2 | 5.58 | <15 | 8.1 | 244 | <0.75 | <1 | 60.5 | 9.2 | 38.5 | 10.9 | 0.06 | <2.5 | 44.5 | <15 | <1 | <20 | 66.7 | 326 |
| B-04-2 | 3.41 | <15 | 7.07 | 187 | <0.75 | 1.51 | 53.6 | 7.05 | 84.6 | 10.9 | <0.05 | <2.5 | 37.4 | <15 | <1 | <20 | 59.9 | 404 |
| B-05-2 | 3.80 | <15 | 5.02 | 106 | <0.75 | <1 | 57.8 | 12.6 | 29.9 | 12 | <0.05 | <2.5 | 52.5 | <15 | <1 | <20 | 64 | 497 |
| B-06-1 | 6.95 | <15 | <5 | 206 | <0.75 | <1 | 63.7 | 6.77 | 49 | 12.4 | <0.05 | <2.5 | 49.2 | <15 | <1 | <20 | 75.1 | 62.7 |
| B-07-1 | 6.85 | <15 | 11.6 | 100 | <0.75 | <1 | 77.3 | 10.6 | 70.1 | 9.87 | <0.05 | <2.5 | 61.2 | <15 | <1 | <20 | 72.1 | 76.5 |
| B-08-2 | 4.79 | <15 | 13.9 | 249 | <0.75 | 1.09 | 56.2 | 13.4 | 30.9 | 13.7 | <0.05 | <2.5 | 50.2 | <15 | <1 | <20 | 77.3 | 464 |
| B-09-1 | 4.73 | <15 | 7.24 | 150 | <0.75 | <1 | 56.8 | 9.42 | 24.9 | 8.14 | <0.05 | <2.5 | 48 | <15 | <1 | <20 | 57.9 | 538 |
| B-10-4 | 7.01 | <15 | 6.64 | 176 | <0.75 | <1 | 55.6 | 6.98 | 30.7 | 13.8 | <0.05 | <2.5 | 36.5 | <15 | <1 | <20 | 58.1 | 53.7 |
| B-11-4 | 7.00 | <15 | 9.38 | 222 | <0.75 | <1 | 51.8 | 10.3 | 30.8 | 41.6 | 0.17 | <2.5 | 37.9 | <15 | <1 | <20 | 64.1 | 67.1 |
| B-12-3 | 7.44 | <15 | <5 | 260 | <0.75 | <1 | 53.8 | 19.9 | 33.5 | 95.1 | 0.11 | <2.5 | 47.8 | <15 | <1 | <20 | 67.2 | 103 |
| B-13-1 | 7.66 | <15 | 96.6 | 514 | <0.75 | 1.13 | 49.6 | 7.86 | 49.4 | 1160 | 0.25 | <2.5 | 35.7 | <15 | <1 | <20 | 67.9 | 515 |
| B-14-2 | 7.90 | <15 | 5.89 | 239 | <0.75 | <1 | 50.9 | 4.79 | 34.5 | 484 | 0.07 | <2.5 | 33.1 | <15 | <1 | <20 | 49.6 | 65.6 |
| B-15-4 | 7.43 | <15 | <5 | 156 | <0.75 | <1 | 64.3 | 12.4 | 81.4 | 9.61 | <0.05 | <2.5 | 57 | <15 | <1 | <20 | 52.8 | 75 |
| B-16-2 | 7.14 | <15 | <5 | 240 | <0.75 | <1 | 63 | 10.2 | 40.7 | 8.87 | <0.05 | <2.5 | 44.4 | <15 | <1 | <20 | 62.5 | 52.4 |
| B-16-3 | 6.99 | <15 | <5 | 148 | <0.75 | <1 | 52.4 | 8.91 | 38.7 | 6.97 | <0.05 | <2.5 | 39.2 | <15 | <1 | <20 | 43.9 | 49.7 |
| B-17-2 | 6.73 | <15 | <5 | 250 | <0.75 | <1 | 73.9 | 13.2 | 46.4 | 10.4 | 0.21 | <2.5 | 73.3 | <15 | <1 | <20 | 73.8 | 67 |
| B-18-2 | 6.39 | <15 | <5 | 184 | <0.75 | <1 | 90.5 | 9.2 | 54 | 7.47 | 0.15 | <2.5 | 54.7 | <15 | <1 | <20 | 74.7 | 68.4 |
| B-19-2 | 3.65 | <15 | <5 | 114 | <0.75 | 1.8 | 72.5 | 8.12 | 58.7 | 20.2 | 0.11 | <2.5 | 34.5 | <15 | <1 | <20 | 64 | 72.4 |
| B-20-2 | 7.37 | <15 | 5.14 | 137 | <0.75 | <1 | 59.7 | 6.22 | 66.1 | 13.6 | <0.05 | <2.5 | 49.1 | <15 | <1 | <20 | 51.7 | 73.2 |
| COURT-1 | 3.0 | 10.7 | 397 | 612 | <0.5 | <0.5 | 3.2 | <1.0 | 48.3 | 594 | 4.72 | 11.9 | 1.1 | 2.9 | 5.9 | 47.7 | 0.9 | 291 |
| COURT-2 | 2.80 | 16.2 | 734 | 332 | <0.5 | <1.0 | 43.3 | 1.2 | 8.4 | 692 | 6.28 | 16.6 | 3.1 | 3.4 | 9.8 | 62.1 | 2.9 | 443 |
| CRACK-1 | | | 14.4 | | | | | | | 5.5 | <0.25 | | | | | | | 7540 |

Note: Shading indicates result was greater than TTL.

Depth ?

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

| Sample | Depth (feet) | pH | Arsenic | Lead | Zinc | Comments |
|---------|--------------|------|---------|------|------|----------|
| TTL | | | 500 | 1000 | 5000 | |
| B-01-1 | 0.5 | 7.25 | 11.1 | 116 | 94.7 | PF |
| B-01-2 | 3 | | 10.4 | 39.9 | 140 | PF |
| B-01-3 | 4.5 | 7.29 | 5.09 | 88.7 | 72.3 | OF |
| B-01-4 | 6 | 7.25 | | 8.21 | 41.8 | OF |
| B-01-5 | 7.5 | | | <5 | 41.1 | OF |
| B-01-6 | 10.5 | 8.23 | | | | |
| B-01-7 | 11 | 8.25 | | 7.57 | 54.2 | |
| B-01-8 | 13.5 | 8.30 | | | | |
| B-01-9 | 16 | | | | | |
| B-01-10 | 19 | | | | | |
| B-02-1 | 1 | 6.26 | 5.3 | 11.9 | 621 | OF |
| B-02-2 | 3 | 7.25 | | 5.78 | 44.1 | |
| B-02-3 | 5.5 | 7.32 | | 8.8 | 44.4 | |
| B-02-4 | 6 | 7.30 | | 8.94 | 48.3 | |
| B-02-5 | 9 | 7.54 | | 8.43 | 52.6 | |
| B-02-6 | 11 | 7.94 | | | | |
| B-02-7 | 14 | | | | | |
| B-03-1 | 0.5 | 3.87 | 18.8 | 13.2 | 299 | AB |
| B-03-2 | 1 | 5.58 | 8.1 | 10.9 | 326 | OF |
| B-03-3 | 3 | 7.08 | <5 | 6.97 | 52.3 | OF |
| B-03-4 | 4 | 7.59 | <5 | 9.49 | 51.2 | |
| B-03-5 | 4.5 | 7.66 | <5 | 6.86 | 54.5 | |
| B-03-6 | 8.5 | 7.72 | <5 | 9.73 | 59.9 | |
| B-03-7 | 10.5 | 7.78 | | | | |
| B-03-8 | 13.5 | | | | | |
| B-04-1 | 0.5 | | 458 | 144 | 432 | AB? |
| B-04-2 | 1 | 3.41 | 7.07 | 10.9 | 404 | OF |
| B-04-3 | 3 | 6.63 | | 7.42 | 57.1 | OF |
| B-04-4 | 4.5 | 7.05 | | 9.85 | 44.6 | OF |
| B-04-5 | 7.5 | 7.50 | | 6.09 | 53 | |
| B-04-6 | 8 | 7.36 | | 6.37 | 62.9 | |
| B-04-7 | 11 | 7.66 | | | | |
| B-04-8 | 13 | | | | | |
| B-04-9 | 16 | | | | | |
| B-05-1 | 0.5 | 3.31 | 388 | 496 | 328 | AB? |
| B-05-2 | 1 | 3.80 | 5.02 | 12 | 497 | OF |

Note: Shading indicates result greater than TTL.

AB= Aggregate Base Material

PF= Park Fill

OF= Intact Old Fill

1978= 1978 Fill

No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

| Sample | Depth (feet) | pH | Arsenic | Lead | Zinc | Comments |
|---------|--------------|------|---------|------|------|----------|
| TTLC | | | 500 | 1000 | 5000 | |
| B-05-3 | 2.5 | 7.11 | | 7.45 | 36 | OF |
| B-05-4 | 4.5 | | | | | |
| B-05-5 | 6.5 | 8.14 | | 10.1 | 49.7 | |
| B-05-6 | 7 | 8.14 | | 8.4 | 51.2 | |
| B-05-7 | 10 | | | 9.02 | 63.3 | |
| B-05-8 | 12 | 8.10 | | | | |
| B-05-9 | 15 | | | | | |
| B-06GRB | 0.5 | 6.44 | <5 | <5 | 26.7 | SAND |
| B-06-1 | 1 | 6.95 | <5 | 12.4 | 62.7 | OF |
| B-06-2 | 3 | 7.59 | | | | |
| B-06-3 | 5.5 | 7.90 | | | | |
| B-06-4 | 6 | 7.87 | | | | |
| B-06-5 | 9 | 7.54 | | | | |
| B-06-6 | 11 | 7.80 | | | | |
| B-06-7 | 14 | | | | | |
| B-07GRB | 0.5 | 6.34 | <5 | 5.52 | 27.6 | SAND |
| B-07-1 | 1.5 | 6.85 | 11.6 | 9.87 | 76.5 | OF |
| B-07-2 | 3 | 7.00 | <5 | 5.39 | 62 | OF |
| B-07-3 | 6 | 7.69 | <5 | <5 | 72.9 | |
| B-07-4 | 6.5 | 7.71 | <5 | 7.92 | 63.6 | |
| B-07-5 | 9.5 | 7.51 | <5 | 6.67 | 50.4 | |
| B-07-6 | 11 | 7.50 | | | | |
| B-07-7 | 14 | | | | | |
| B-08-1 | 0.5 | 3.25 | 450 | 481 | 309 | AB? |
| B-08-2 | 1 | 4.79 | 13.9 | 13.7 | 464 | OF |
| B-08-3 | 3 | 6.80 | <5 | 6.49 | 38.4 | OF |
| B-08-4 | 4.5 | 7.68 | 6.24 | 7.1 | 33 | OF |
| B-08-5 | 7 | 8.01 | 5.45 | 6.16 | 40.7 | |
| B-08-6 | 7.5 | | | | | |
| B-08-7 | 10.5 | 7.78 | | | | |
| B-08-8 | 12.5 | | | | | |
| B-08-9 | 15.5 | | | | | |
| B-09-1 | 1 | 4.73 | 7.24 | 8.14 | 538 | OF |
| B-09-2 | 3 | 6.94 | | 5.71 | 36.8 | OF |
| B-09-3 | 4.5 | 7.23 | | 6.32 | 55.6 | |
| B-09-4 | 7 | 7.37 | | 7.14 | 43.3 | |

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material

PF= Park Fill

OF= Intact Old Fill

1978= 1978 Fill

No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

| Sample | Depth (feet) | pH | Arsenic | Lead | Zinc | Comments |
|---------|--------------|------|---------|------|------|----------|
| TTLC | | | 500 | 1000 | 5000 | |
| B-09-5 | 9.5 | 7.66 | | | | |
| B-09-6 | 10 | | | | | |
| B-09-7 | 12 | | | | | |
| B-09-8 | 15 | | | | | |
| B-10-1 | 0.5 | 7.21 | 10.2 | 52.7 | 164 | PF |
| B-10-2 | 2.5 | | | | | PF |
| B-10-3 | 4 | 7.23 | 7.43 | 37.6 | 75.7 | PF |
| B-10-4 | 6 | 7.01 | 6.64 | 13.8 | 53.7 | OF |
| B-10-5 | 7.5 | 7.07 | | | | OF |
| B-10-6 | 9 | | | | | |
| B-10-7 | 10.5 | 7.84 | | | | |
| B-10-8 | 11 | | | | | |
| B-10-9 | 14.5 | 7.70 | | | | |
| B-10-10 | 17 | 7.96 | | | | |
| B-10-11 | 20 | | | | | |
| B-11-1 | 1 | | | | | PF |
| B-11-2 | 1.5 | 6.71 | 27.4 | 46.3 | 108 | PF |
| B-11-3 | 3 | | | | | OF |
| B-11-4 | 3.5 | 7.00 | 9.38 | 41.6 | 67.1 | OF |
| B-11-5 | 4 | | | | | OF |
| B-11-6 | 6.5 | 7.16 | | | | OF |
| B-11-7 | 9 | 7.22 | | | | |
| B-11-8 | 11 | 7.77 | | | | |
| B-11-9 | 14 | 7.56 | | | | |
| B-12-1 | 0.5 | 6.87 | | 29.1 | 61.7 | PF |
| B-12-2 | 1.5 | 7.19 | 6.65 | 105 | 108 | PF |
| B-12-3 | 3 | 7.44 | <5 | 95.1 | 103 | PF |
| B-12-4 | 4 | | | 185 | 127 | PF |
| B-12-5 | 4.5 | 7.55 | | 502 | 95.5 | PF |
| B-12-6 | 6 | | | | | OF |
| B-12-7 | 9 | 8.01 | | 8.8 | 78.7 | OF |
| B-12-8 | 11 | 7.94 | | | | |
| B-12-9 | 14 | 7.93 | | | | |
| B-13-1 | 1 | 7.66 | 96.6 | 1160 | 515 | OF |
| B-13-2 | 3 | 7.56 | <5 | 6.05 | 39.8 | OF |
| B-13-3 | 4.5 | | <5 | <5 | 42.6 | OF |

Note: Shading indicates result greater than TTLC.

AB= Aggregate Base Material

PF= Park Fill

OF= Intact Old Fill

1978= 1978 Fill

No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

| Sample | Depth (feet) | pH | Arsenic | Lead | Zinc | Comments |
|--------|--------------|-------|---------|------|------|----------|
| TTL | | | 500 | 1000 | 5000 | |
| B-13-4 | 7 | 7.93 | <5 | 6.22 | 55.9 | |
| B-13-5 | 8.5 | 8.05 | | | | |
| B-13-6 | 9 | 8.04 | | | | |
| B-13-7 | 12 | | | | | |
| B-13-8 | 14 | | | | | |
| B-13-9 | 17 | | | | | |
| B-14-1 | 1 | 7.22 | | 13.3 | 60.3 | PF |
| B-14-2 | 3 | 7.90 | 5.89 | 484 | 65.6 | OF |
| B-14-3 | 4.5 | 11.03 | | 6700 | 132 | OF |
| B-14-4 | 6.5 | 7.39 | | 6.26 | 49.6 | |
| B-14-5 | 8.5 | 7.57 | | 7.6 | 51.7 | |
| B-14-6 | 9 | 7.67 | | | | |
| B-14-7 | 12 | 7.74 | | | | |
| B-14-8 | 14 | | | | | |
| B-14-9 | 16.5 | | | | | |
| B-15-1 | 1 | | | | | PF |
| B-15-2 | 1.5 | 7.10 | 8.4 | 1520 | 91.9 | PF |
| B-15-3 | 3.5 | 6.35 | <5 | 8.1 | 44 | PF |
| B-15-4 | 4.5 | 7.43 | <5 | 9.61 | 75 | |
| B-15-5 | 5 | 7.58 | | | | |
| B-15-6 | 7 | 7.75 | | | | |
| B-15-7 | 10.5 | 7.49 | | | | |
| B-15-8 | 12 | 7.37 | | | | |
| B-15-9 | 15.5 | 7.26 | | | | |
| B-16-1 | 1 | 9.49 | | 138 | 65.4 | 1978/OF |
| B-16-2 | 2.5 | 7.14 | <5 | 8.87 | 52.4 | OF |
| B-16-3 | 3 | 6.99 | <5 | 6.97 | 49.7 | OF |
| B-16-4 | 4 | 6.81 | | | | |
| B-16-5 | 4.5 | | | | | |
| B-16-6 | 6.5 | 8.08 | | | | |
| B-16-7 | 10 | 7.59 | | | | |
| B-16-8 | 11.5 | 7.47 | | | | |
| B-16-9 | 15 | | | | | |
| B-17-1 | 1 | 7.87 | | | | 1978 |
| B-17-2 | 2.5 | 6.73 | <5 | 10.4 | 67 | OF |

Note: Shading indicates result greater than TTL.

AB= Aggregate Base Material

PF= Park Fill

OF= Intact Old Fill

1978= 1978 Fill

No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

| Sample | Depth (feet) | pH | Arsenic | Lead | Zinc | Comments |
|--------|--------------|------|---------|------|------|----------|
| TTLc | | | 500 | 1000 | 5000 | |
| B-17-3 | 3 | | | | | OF |
| B-17-4 | 4.5 | 7.76 | | | | |
| B-17-5 | 6 | 7.89 | | | | |
| B-17-6 | 9.5 | 7.94 | | | | |
| B-17-7 | 14.5 | | | | | |
| B-18-1 | 1 | 8.08 | | | | 1978 |
| B-18-2 | 2.5 | 6.39 | <5 | 7.47 | 68.4 | OF |
| B-18-3 | 4 | | | | | OF |
| B-18-4 | 4.5 | 7.03 | | | | |
| B-18-5 | 7.5 | 7.57 | | | | |
| B-18-6 | 10.5 | 7.43 | | | | |
| B-18-7 | 12.5 | 7.56 | | | | |
| B-18-8 | 15 | | | | | |
| B-19-1 | 1 | 7.67 | <5 | 11.6 | 64.4 | 1978 |
| B-19-2 | 3 | 3.65 | <5 | 20.2 | 72.4 | OF |
| B-19-3 | 4.5 | | | | | OF |
| B-19-4 | 5.5 | 4.10 | | 7.48 | 61.5 | OF |
| B-19-5 | 6 | | | | | |
| B-19-6 | 8.5 | 7.10 | | 8.22 | 44.3 | |
| B-19-7 | 11 | 7.56 | | | | |
| B-19-8 | 13 | | | | | |
| B-19-9 | 16 | | | | | |
| B-20-1 | 0.5 | 7.61 | | | | OF |
| B-20-2 | 2 | 7.37 | 5.14 | 13.6 | 73.2 | OF |
| B-20-3 | 3.5 | 7.48 | | | | |
| B-20-4 | 6 | 8.13 | | | | |
| B-20-5 | 6.5 | 8.10 | | | | |
| B-20-6 | 9.5 | 7.79 | | | | |
| B-20-7 | 11.5 | 7.92 | | | | |
| B-20-8 | 14.5 | | | | | |
| B-21-1 | 0.5 | | | | | PF |
| B-21-2 | 1.5 | 7.29 | <5 | 91 | 56.7 | OF |
| B-21-3 | 3 | 7.44 | <5 | 111 | 60.1 | OF |
| B-21-4 | 6 | 7.12 | 5.89 | 8.61 | 41.4 | |
| B-21-5 | 6.5 | | | | | |

Note: Shading indicates result greater than TTLc.

AB= Aggregate Base Material

PF= Park Fill

OF= Intact Old Fill

1978= 1978 Fill

No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

| Sample | Depth (feet) | pH | Arsenic | Lead | Zinc | Comments |
|---------|--------------|------|---------|------|------|----------|
| TTL | | | 500 | 1000 | 5000 | |
| B-21-6 | 8.5 | 7.49 | <5 | 5.68 | 47 | |
| B-22-1 | 0.5 | 6.93 | 6.81 | 115 | 133 | PF |
| B-22-2 | 3 | 7.94 | 5.59 | 319 | 42.4 | OF |
| B-22-3 | 3.5 | 7.86 | <5 | 18 | 47.9 | OF |
| B-22-4 | 7.5 | 3.63 | 8.81 | <5 | 68.3 | |
| B-22-5 | 8 | | | | | |
| B-23-1 | 0.5 | 6.26 | 12.6 | 1100 | 113 | PF |
| B-23-2 | 2.5 | 7.74 | 6.04 | 1310 | 73.1 | PF |
| B-23-3 | 5.5 | 7.17 | <5 | 10.4 | 38.7 | OF |
| B-23-4 | 8 | 7.32 | <5 | 6.21 | 37.8 | |
| B-24-1 | 0.5 | 4.08 | 9.2 | <5 | 177 | AB? |
| B-24-2 | 2.5 | 5.27 | 34.2 | 10.7 | 51.7 | |
| B-24-3 | 3 | 7.02 | 8.7 | 5.86 | 44.1 | |
| B-24-4 | 5.5 | 7.12 | 6.5 | 5.87 | 46.8 | |
| B-24-5 | 7.5 | 7.28 | 10.3 | <5 | 52.1 | |
| B-25-1 | 0.5 | 5.91 | <5 | 8.0 | 65.5 | AB? |
| B-25-2 | 1 | 6.85 | <5 | 7.5 | 44.8 | OF |
| B-25-3 | 2.5 | 7.20 | <5 | 5.88 | 47.1 | |
| B-25-4 | 3 | | | | | |
| B-25-5 | 4.5* | | | | | |
| B-25-6 | 5 | 7.24 | 17.1 | 7.77 | 49.2 | |
| B-25-7 | 7 | 7.70 | 6.04 | 6.62 | 53.8 | |
| B-26-1 | 0.5 | 6.59 | 6.91 | 12.6 | 83 | 1978 |
| B-26-2 | 3 | 7.30 | <5 | 8.07 | 54.5 | OF |
| B-26-3 | 6 | 7.73 | <5 | 8.09 | 44.4 | |
| B-26-4 | 8 | 7.52 | <5 | 6.83 | 51.7 | |
| COURT-1 | | 3.0 | 397 | 594 | 291 | AB |
| COURT-2 | | 2.8 | 734 | 692 | 443 | AB (C) |

Note: Shading indicates result greater than TTL.

AB= Aggregate Base Material

PF= Park Fill

OF= Intact Old Fill

1978= 1978 Fill

(C) = Composite sample

No note for native soil.

Table 2. Summary of Soil Results for pH and Arsenic, Lead, and Zinc (mg/kg).

| Sample | Depth (feet) | pH | Arsenic | Lead | Zinc | Comments |
|---------|--------------|-----|---------|------|------|----------|
| TTLC | | | 500 | 1000 | 5000 | |
| CRACK-1 | | 1.5 | 14.4 | 5.5 | 7450 | PPT (C) |
| CRACK-A | | 2.4 | 29.6 | 16.1 | 6080 | PPT |
| CRACK-B | | 2.1 | 11.7 | 18.3 | 6790 | PPT |
| CRACK-C | | 1.9 | 23.0 | 28.2 | 6200 | PPT |
| CRACK-D | | 1.4 | 7.4 | 14.9 | 7990 | PPT |
| CRACK-E | | 1.5 | 33.0 | 9.3 | 8380 | PPT |
| CRACK-F | | 1.9 | 8.4 | 35.1 | 4320 | PPT |
| CRACK-G | | 1.5 | 9.7 | 19.7 | 6260 | PPT (D) |
| CRACK-H | | 1.6 | 22.4 | 15.9 | 6110 | PPT |
| CRACK-J | | 1.4 | 25.7 | 18.5 | 5820 | PPT (D) |

Note: Shading indicates result greater than TTLC.

AB = Aggregate Base Material

PF = Park Fill

OF = Intact Old Fill

PPT = Precipitate

1978 = 1978 Fill

(C) = Composite sample

(D) = Paired duplicate sample

No note for native soil.

* Sample contained slough from above; results are not representative of actual conditions.

TABLE 3-SUMMARY OF SOIL RESULTS FOR SOLUBLE METALS (mg/L).

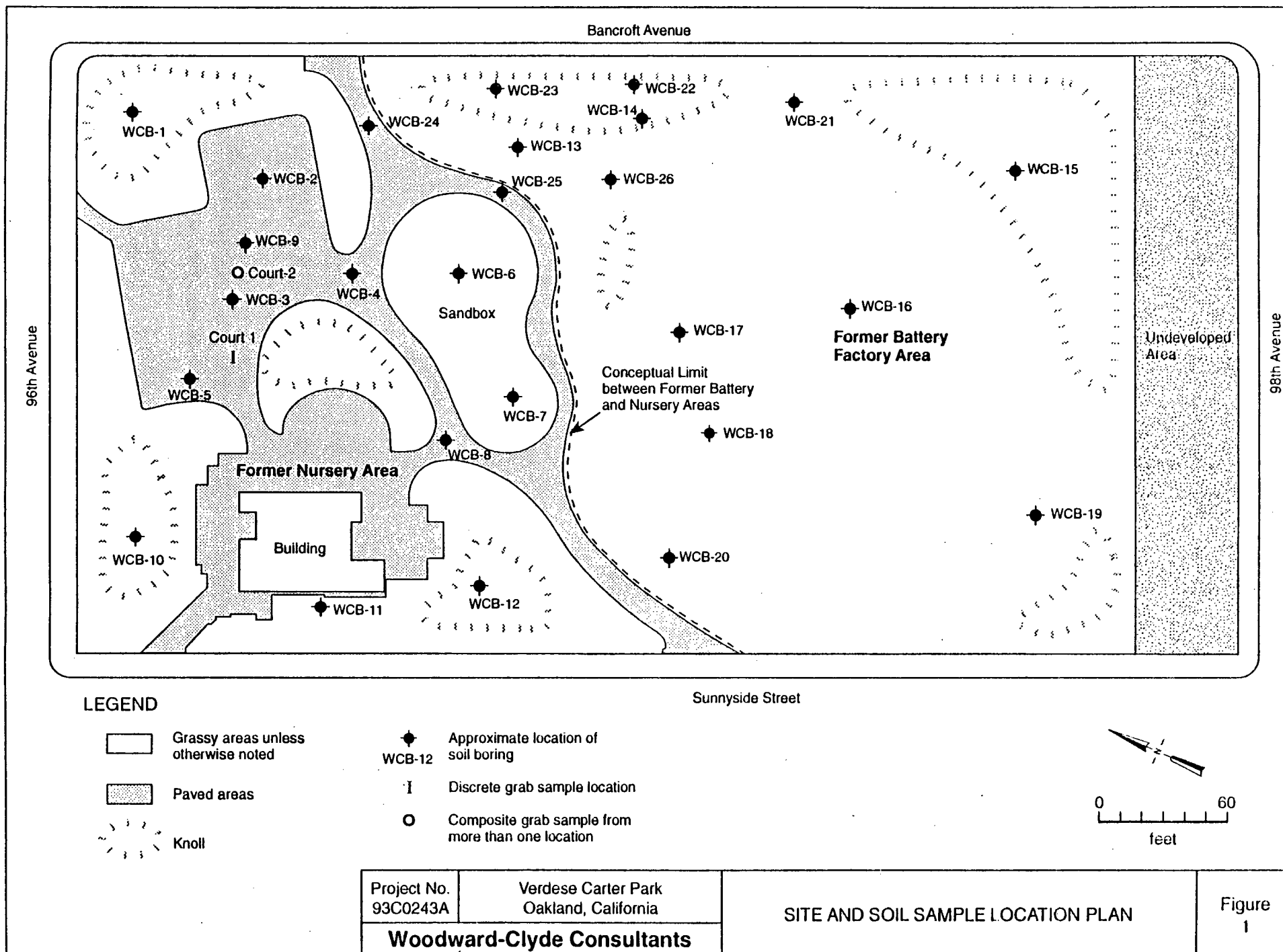
| Sample | Arsenic | Lead | Mercury | Zinc | Comments |
|--------------|---------|-------|---------|------|----------|
| STLC | 5 | 5 | 0.2 | 250 | |
| COURT2/WET | 8.8 | 0.4 | <0.005 | 4.1 | AB |
| COURT2/DIWET | <0.05 | <0.03 | <0.005 | 3.31 | AB |

Note: Shading indicates result greater than STLC.

AB= Aggregate Base Material

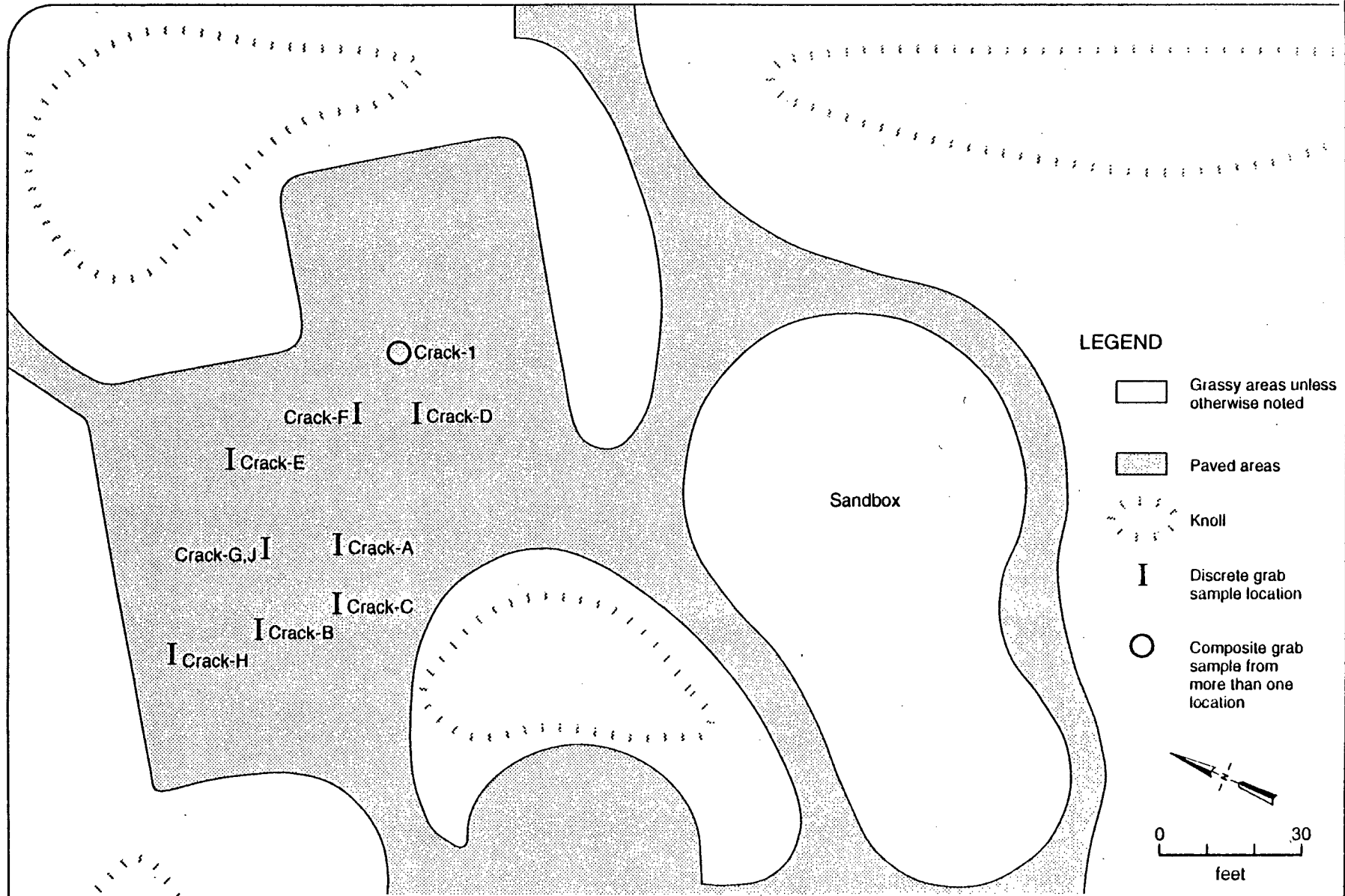
WET= soluble metal concentrations by California Analytical Method Waste Extraction Test (WET Test)

DIWET= Modified WET test using deionized water instead of standard citrate solution.



Bancroft Avenue

96th Avenue



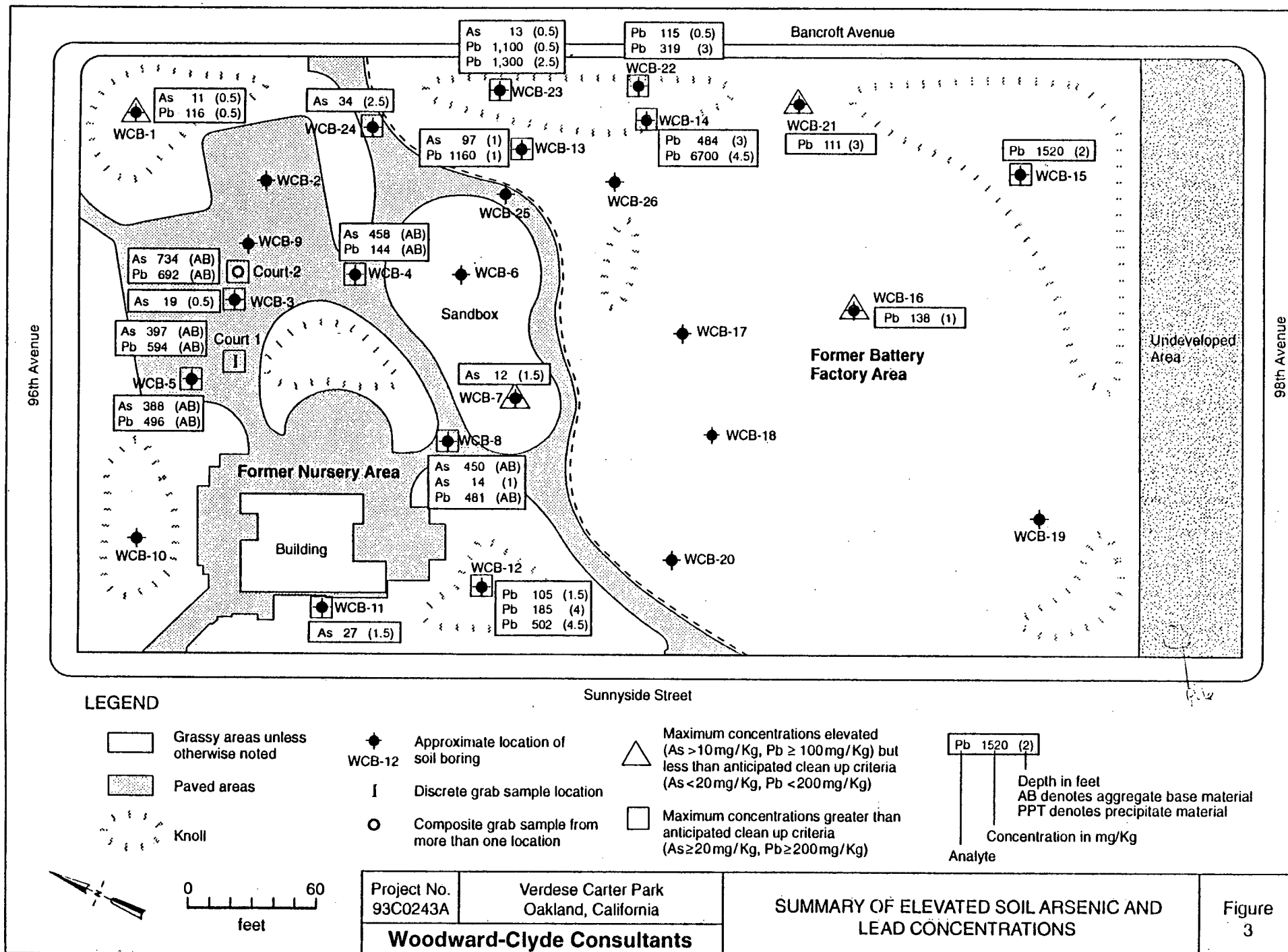
Project No.
93C0243A

Verdesse Carter Park
Oakland, California

Woodward-Clyde Consultants

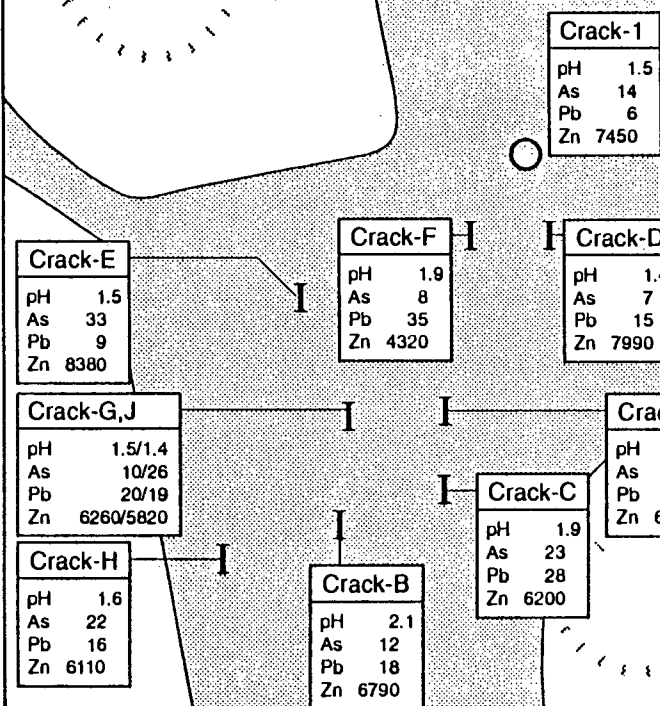
**PAVEMENT CRACK PRECIPITATE
SAMPLE LOCATION PLAN**

**Figure
2**



Bancroft Avenue

96th Avenue



LEGEND

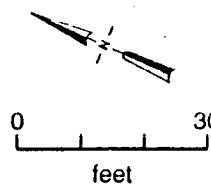
Grassy areas unless otherwise noted

Paved areas

Knoll

Discrete grab sample location

Composite grab sample from more than one location



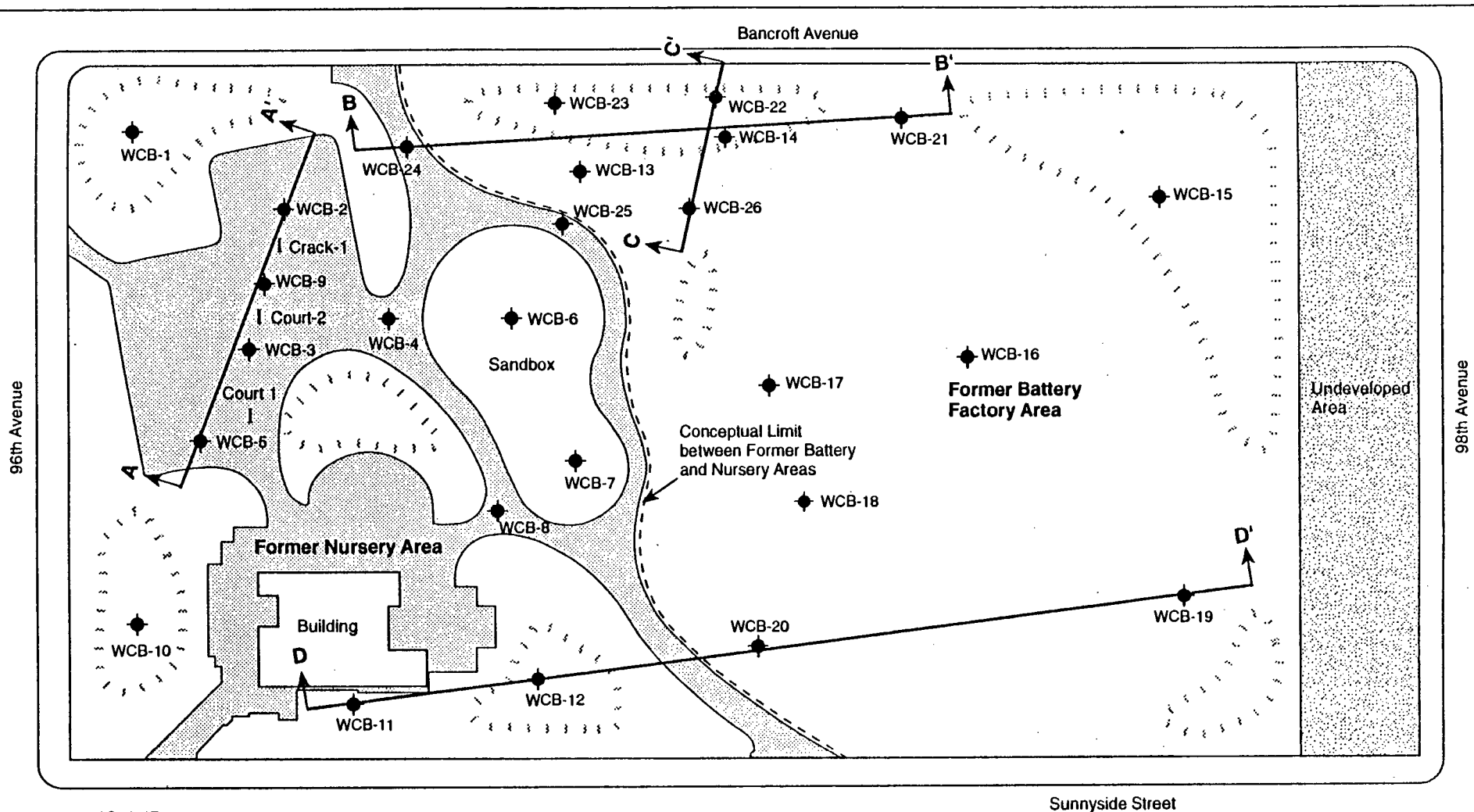
Project No.
93C0243A

Verdese Carter Park
Oakland, California




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**SUMMARY OF PRECIPITATE
pH, ARSENIC, LEAD, AND ZINC
CONCENTRATIONS (mg/kg)**


Figure
4

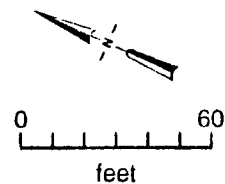


LEGEND

-  Grassy areas unless otherwise noted
-  Paved areas
-  Knoll

-  WCB-12 Approximate location of soil boring
-  Aggregate base/precipitate material samples, Court-2 and Crack-1 composited from baseball court area

 Cross-Section location



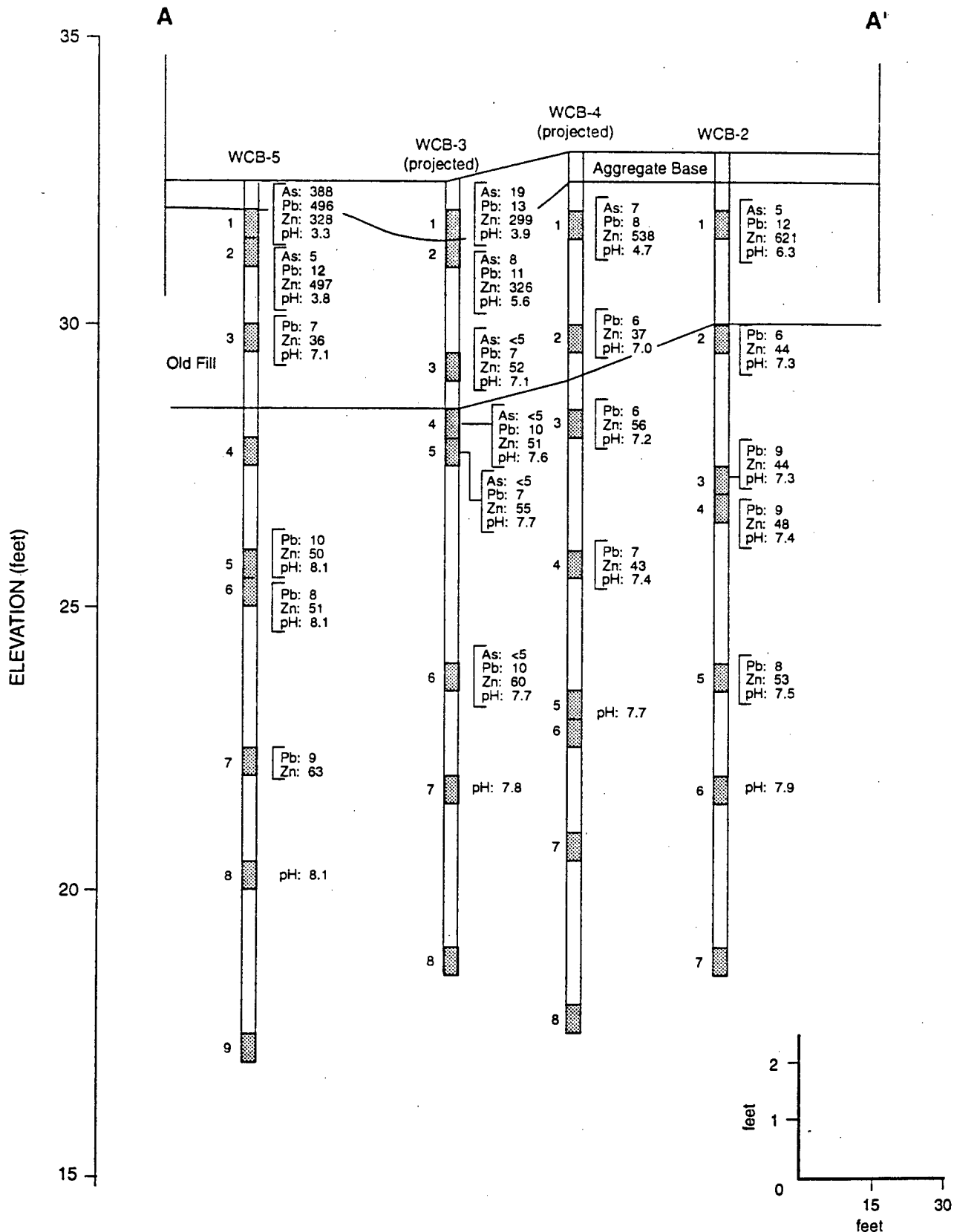
Project No.
93C0243A

Verde Carter Park
Oakland, California

Woodward-Clyde Consultants

LOCATIONS OF CROSS-SECTIONS

Figure
5



Note: Concentrations (in mg/Kg) have been rounded to the nearest whole number and pH to one decimal place.

Vertical Scale: 1" = 2.5 ft
Horizontal Scale: 1" = 30 ft

Project No.
93C0243A

Verdes Carter Park
Oakland, California

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CROSS-SECTION A-A'

**Figure
6**

ELEVATION (feet)

40

35

30

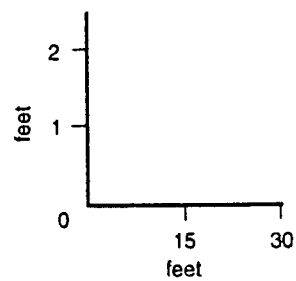
25

20

E

Ag

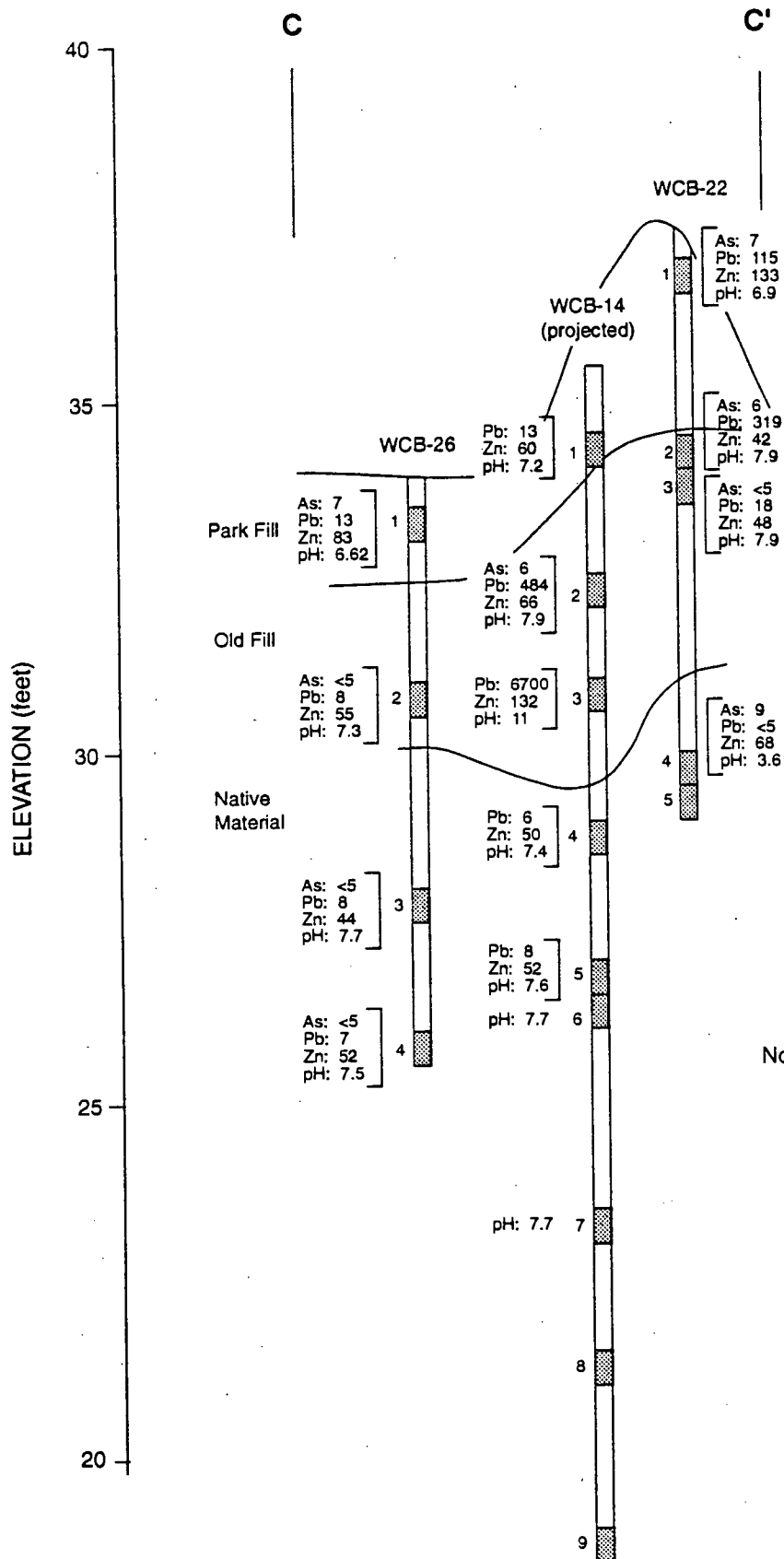
Note: Concentrations (in mg/Kg) have been rounded to the nearest whole number and pH to one decimal place.



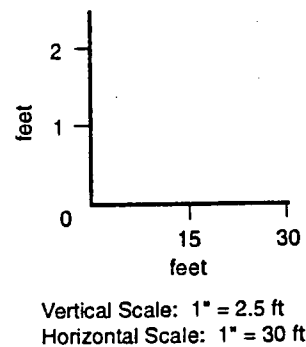
Vertical Scale: 1" = 2.5 ft
Horizontal Scale: 1" = 30 ft

CROSS-SECTION B-B'

Figure
7



Note: Concentrations (in mg/Kg) have been rounded to the nearest whole number and pH to one decimal place.



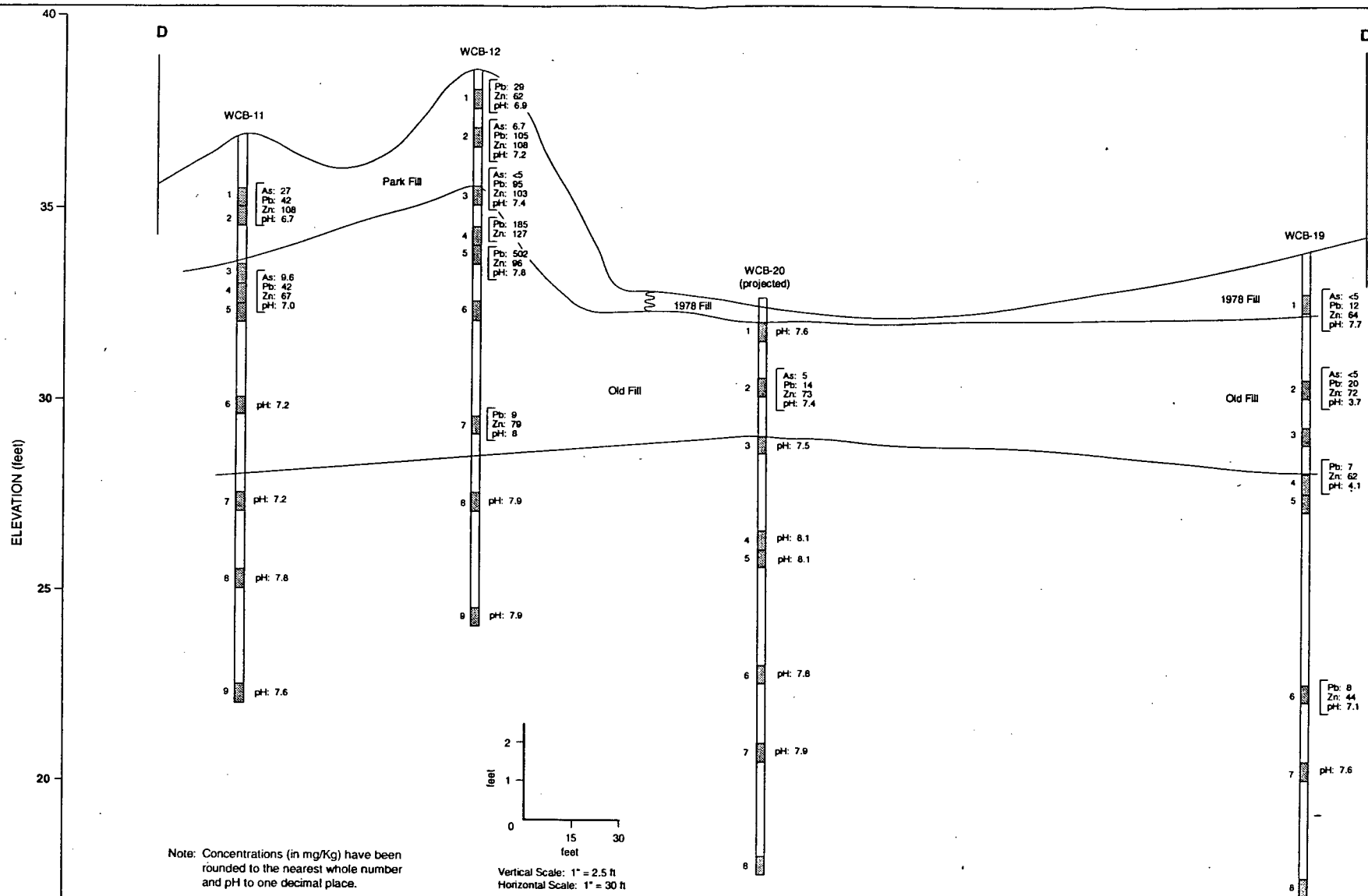
Project No.
93C0243A

Verdesse Carter Park
Oakland, California

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CROSS-SECTION C-C'

**Figure
8**



| | | | |
|----------------------------|--------------------------------------------|--------------------|-------------|
| Project No. 93C0243A | Verdese Carter Park Oakland, California | CROSS-SECTION D-D' | Figure 9 |
| Woodward-Clyde Consultants | | | |

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-3

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/14/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 14.0 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|----------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-2" ASPHALT | | | | | |
| | | | B-3-1 | | | | CLAYEY SANDY GRAVEL (GP)(AB) | | | | | |
| | | | B-3-2 | | | | Yellow | | | | | |
| | | | | | | | (PARK FILL) | | | | | |
| | | | | | | | SILTY CLAY (CL)(FILL) | | | | | |
| | | | | | | | Very dark brown to black, firm to soft | | | | | |
| 30 | | | | | | | | | | | | |
| | | | B-3-3 | | | | | | | | | |
| | | | | | | | (OLD FILL) | | | | | |
| | | | B-3-4 | | | | SILTY CLAY (CL) | | | | | |
| | | | B-3-5 | | | | Olive | | | | | |
| 5 | | | | | | | SANDY CLAY (CL) | | | | | |
| | | | | | | | Yellow brown | | | | | |
| | | | | | | | | | | | | |
| 25 | | | | | | | SILTY CLAY (CL) | | | | | |
| | | | B-3-6 | | | | Yellow brown | | | | | |
| | | | | | | | | | | | | |
| 10 | | | | | | | SANDY SILTY CLAY (CL) | | | | | |
| | | | B-3-7 | | | | Light yellow brown, mottled | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| | | | B-3-8 | | | | | | | | | |
| | | | | | | | | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring - WCB-4

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|--------------------------------|------------|
| Date(s) Drilled | 5/13/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 16.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Cement Grout Backfill | |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 34 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 2" ASPHALT | | | | | |
| | | | B-4-1 | | | | SANDY CLAYEY GRAVEL (GC) (AB) | | | | | |
| | | | B-4-2 | | | | Yellow (PARK FILL) | | | | | |
| | | | | | | | SILTY CLAY (CL) (FILL) | | | | | |
| | | | | | | | Black, damp, firm | | | | | |
| 30 | | | B-4-3 | | | | GRAVELLY CLAY (CL) (FILL) | | | | | |
| | | | | | | | Orange brown, damp, loose, angular gravel - subrounded gravels to 35% | | | | | |
| 5 | | | B-4-4 | | | | (OLD FILL) | | | | | |
| | | | | | | | SILTY CLAY (CL) | | | | | |
| | | | | | | | Olive gray, damp, firm | | | | | |
| 25 | | | B-4-5 | | | | | | | | | |
| | | | B-4-6 | | | | | | | | | |
| 10 | | | | | | | SILTY SANDY CLAY (CL) | | | | | |
| | | | | | | | Light yellow brown, mottled with gray clay, damp, stiff, 20 to 30% very fine grained sand | | | | | |
| | | | B-4-7 | | | | | | | | | |
| 20 | | | B-4-8 | | | | SANDY CLAY (CL) | | | | | |
| | | | | | | | Yellow brown, damp, stiff, 20-30% very fine grained sand | | | | | |
| 15 | | | | | | | SILTY CLAY (CL) | | | | | |
| | | | | | | | Light yellow brown, mottled with gray clay, moist, firm to stiff | | | | | |
| | | | B-4-9 | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Sheet 1 of 1

Project: Verdese Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-6

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|--------------------------|--------------|----------------------------|-------------------------------|
| Date(s) Drilled | 5/14/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 14.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/ Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|--------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | SAND (SP) Light gray, dry, loose (SANDBOX FILL) | | | | | |
| | | | B-6-1 | | | | SILTY CLAY (CL) (FILL) Very dark brown | | | | | |
| 30 | | | B-6-2 | | | | GRAVELLY CLAY (CL) (FILL) Very dark brown (OLD FILL) | | | | | |
| | | | | | | | SILTY CLAY (CL) Dark olive brown, damp, firm to stiff | | | | | |
| 5 | | | B-6-3 | | | | SANDY SILTY CLAY (CL) Brown to yellow brown, moist, firm | | | | | |
| | | | B-6-4 | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| | | | B-6-5 | | | | SANDY CLAY (CL) Light yellow brown, damp, firm, 20-30% very fine grained to fine grained sand | | | | | |
| 10 | | | B-6-6 | | | | | | | | | |
| 20 | | | | | | | SILTY CLAY (CL) yellow brown, mottled with gray clay, moist, firm | | | | | |
| | | | B-6-7 | | | | | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Woodward-Clyde Consultants



Figure

Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-7

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/14/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 14.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-----------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | SAND (SP) (SANDBOX FILL) | | | | | |
| | | | | | | | GRAVELLY CLAY (CL) (FILL) Very dark brown, damp, firm to stiff, 35% subangular gravel 1/2" x 1/2" size | | | | | |
| 30 | | | B-7-1 | | | | | | | | | |
| | | | | | | | (OLD FILL) | | | | | |
| | | | B-7-2 | | | | SILTY CLAY (CL) Olive gray to grayish brown, mottled, damp, firm to stiff | | | | | |
| 5 | | | | | | | | | | | | |
| | | | B-7-3 | | | | SILTY SANDY CLAY (CL) Light yellow brown, damp to moist, stiff, 25-30% very fine to fine grained sand | | | | | |
| | | | B-7-4 | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| | | | B-7-5 | | | | SILTY CLAY (CL) Yellow brown, damp to moist, firm | | | | | |
| 10 | | | | | | | SANDY CLAY (CL) Light yellow brown, mottled with gray clay, damp, stiff, 20% very fine grained sand | | | | | |
| | | | B-7-6 | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| | | | B-7-7 | | | | SILTY CLAY (CL) Yellow brown, damp to moist, firm | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-8

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|--------------------------|--------------|----------------------------|------------------------------|
| Date(s) Drilled | 5/13/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 16.0 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 34 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | B-8-1 | | | | 2" ASPHALT | | | | | |
| | | | B-8-2 | | | | SANDY SILTY GRAVEL (GC)(AB) yellow stained (PARK FILL) | | | | | |
| | | | | | | | PEBBLY CLAY (CL)(FILL) Very dark brown to black, damp, firm | | | | | |
| 30 | | | B-8-3 | | | | | | | | | |
| | | | B-8-4 | | | | SILTY CLAY (CL) (FILL) Dark olive gray, dry to damp, stiff, brick and concrete debris | | | | | |
| 5 | | | | | | | (OLD FILL) | | | | | |
| | | | B-8-5 | | | | SILTY SANDY CLAY (CL) Olive brown, damp, firm to stiff, 15-20% fine grained sand | | | | | |
| | | | B-8-6 | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| | | | B-8-7 | | | | SANDY SILTY CLAY (CL) Olive brown to orange brown, mottled with saturated gray clay in burrows or rootlets, damp, firm, 15-20% very fine grained sand | | | | | |
| 10 | | | | | | | SANDY CLAY (CL) Orange brown, damp, firm to stiff, 5% subrounded pebbly gravels to 1/8" x 1/8" in size, 25-30% fine grained to medium grained sand | | | | | |
| | | | B-8-8 | | | | SILTY CLAY (CL) Brown mottled with gray clay, moist, firm to stiff | | | | | |
| 20 | | | | | | | | | | | | |
| | | | B-8-9 | | | | | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-9

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|--------------------------|--------------|----------------------------|------------------------------|
| Date(s) Drilled | 5/12/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 15.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 3" ASPHALT OVER 4" AB (PARK FILL) | | | | | |
| | | | B-9-1 | | | | SILTY CLAY (CL) (FILL) Very dark brown to black, damp, stiff, trace 1/4" x 1/8" subrounded pebbles, rootlets and burrows | | | | | |
| 30 | | | B-9-2 | | | | (OLD FILL) | | | | | |
| | | | B-9-3 | | | | SILTY CLAY (CL) Yellow brown, damp, firm to stiff, mottled with brown clay, surfaces moist | | | | | |
| 5 | | | B-9-4 | | | | | | | | | |
| | | | B-9-5 | | | | SANDY SILTY CLAY (CL) Brown, dry, stiff, 5-10% black nodules, 20% very fine grained sand | | | | | |
| 10 | | | B-9-6 | | | | | | | | | |
| | | | B-9-7 | | | | | | | | | |
| 20 | | | B-9-8 | | | | GRAVELLY CLAY (CL) Light brown, very moist, 30% subangular-subrounded gravels to 1" x 1" x 1/2" size | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |



Project: Verdese Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-10

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/12/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 20.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 39 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|---------|---------------------|-------------|----------|--------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | B-10-1 | | | | 0-2" LAWN 2"-4" SILTY SAND (FILL) CLAYEY SILTY SAND (SM) (FILL) Very dark brown to black, dry, medium dense, rootlets | | | | | |
| | | | B-10-2 | | | | | | | | | |
| 35 | | | B-10-3 | | | | PEBBLY CLAY (CL) (FILL) Dark brown, dry, stiff | | | | | |
| 5 | | | | | | | (PARK FILL) (RELOC. OLD FILL?) | | | | | |
| | | | B-10-4 | | | | SILTY CLAY (CL) Very dark brown to black, damp, stiff, trace pebbly gravels, rootlets, with small brick debris clasts | | | | | |
| | | | B-10-5 | | | | | | | | | |
| 30 | | | B-10-6 | | | | (OLD FILL) SILTY CLAY (CL) Dark olive gray, damp, firm to stiff, 5% subangular pebble gravels to 1/8" size | | | | | |
| 10 | | | B-10-7 | | | | | | | | | |
| | | | B-10-8 | | | | SANDY SILTY CLAY (CL) Light yellow brown, dry, stiff | | | | | |
| | | | | | | | | | | | | |
| 25 | | | B-10-9 | | | | SILTY CLAY (CL) Orange brown, mottled with light gray clay, stiff, damp to moist | | | | | |
| 15 | | | | | | | | | | | | |
| | | | B-10-10 | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| | | | B-10-11 | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants



Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-11

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/13/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 14.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 37 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-2" LAWN 2"-4" TOPSOIL | | | | | |
| 35 | | B-11-1 | | | | | SILTY SAND (FILL) Dry, loose | | | | | |
| | | B-11-2 | | | | | PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, angular gravels with debris | | | | | |
| | | B-11-3 | | | | | (PARK FILL) (RELOC. OLD FILL?) | | | | | |
| | | B-11-4 | | | | | SILTY CLAY (CL) (FILL) Very dark brown, damp, stiff, 5% pebbles, rootlets | | | | | |
| | | B-11-5 | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
| 30 | | B-11-6 | | | | | | | | | | |
| | | | | | | | (OLD FILL) | | | | | |
| | | B-11-7 | | | | | SILTY CLAY (CL) Olive gray to dark olive gray, damp, very stiff, 5% pebbly gravels, black nodules | | | | | |
| 10 | | | | | | | | | | | | |
| | | B-11-8 | | | | | SANDY CLAY (CL) Olive brown, damp, very stiff, 20% very fine grained sand, 5% black nodules | | | | | |
| 25 | | | | | | | | | | | | |
| | | B-11-9 | | | | | SILTY CLAY (CL) Light yellow brown, moist, firm to stiff | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | BOTTOM OF BORING | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |



Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-12

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/13/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 14.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 39 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | B-12-1 | | | | 0-2" LAWN CLAYEY SILTY SAND (SM) (FILL) | | | | | |
| | | | B-12-2 | | | | PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff | | | | | |
| 35 | | | B-12-3 | | | | SILTY CLAY (CL) (FILL) Very dark gray to black, damp, stiff | | | | | |
| | | | B-12-4 | | | | glass and wood debris | | | | | |
| 5 | | | B-12-5 | | | | (PARK FILL) (RELOC. OLD FILL) | | | | | |
| | | | B-12-6 | | | | SILTY CLAY (CL) (FILL) Very dark gray to black, damp, stiff wood debris | | | | | |
| 30 | | | B-12-7 | | | | wood debris | | | | | |
| 10 | | | B-12-8 | | | | (OLD FILL) SILTY CLAY (CL) Olive, mottled with orange brown sandy clay, damp, firm | | | | | |
| 25 | | | B-12-9 | | | | | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| 20 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-13

Sheet 1 of 1

| | | |
|-------------------------------------------------------------------|---------------------------------------|-------------------------------------------|
| Date(s) Drilled 5/11/93 | Logged By W. Loskutoff | Checked By M. McGuire |
| Drilling Method Hollow Stem Auger | Drill Bit Size/Type | Total Depth Drilled (feet) 17.5 |
| Drill Rig Type CME 55 | Drilled By HEW | Borehole Backfill Cement Grout |
| Apparent Groundwater Depth ____ ft ATD ____ ft after ____ days | Hammer Type | Hammer Weight/Drop (lbs/in.) |
| Comments Mod. Cal Drive Sampler | Surface Elevation (feet) 35 | Elevation Datum |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|---------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | 35 | | | | | | 0-2" LAWN | | | | | |
| | | | | | | | SILTY CLAYEY SAND (SC) (FILL) | | | | | |
| | | | | | | | (PARK FILL) | | | | | |
| | | | B-13-1 | | | | PEBBLY CLAY (CL) (FILL) | | | | | |
| | | | | | | | Very dark brown to black, dry, stiff, 20-30% angular-subrounded gravels to 1/4" x 1/4" size | | | | | |
| | | | B-13-2 | | | | decrease gravels to 5-10%, with rootlets and small brick debris, angular pebbles | | | | | |
| 5 | 30 | | B-13-3 | | | | debris from 5'-6' | | | | | |
| | | | | | | | (OLD FILL) | | | | | |
| | | | B-13-4 | | | | SILTY CLAY (CL) | | | | | |
| | | | | | | | Light brown, dry, very stiff, trace subrounded pebbly gravels to 1/8" x 1/4" size | | | | | |
| | | | B-13-5 | | | | | | | | | |
| | | | B-13-6 | | | | | | | | | |
| 10 | 25 | | B-13-7 | | | | | | | | | |
| | | | B-13-8 | | | | SANDY SILTY CLAY (CL) | | | | | |
| | | | | | | | Light brown to olive brown, damp, stiff, damp, 20% very fine grained to fine grained sand | | | | | |
| 15 | 20 | | B-13-9 | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 20 | 15 | | | | | | | | | | | |

Figure

Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-14

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|--------------------------|--------------|----------------------------|------------------------------|
| Date(s) Drilled | 5/11/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 17.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 36 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-----------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | 35 | | | | | | 0-2" LAWN SILTY SAND (SM) (FILL) Light brown, very fine grained sand (PARK FILL) | | | | | |
| | | | B-14-1 | | | | PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, 20-30% pebbly gravels | | | | | |
| | | | B-14-2 | | | | | | | | | |
| | | | B-14-3 | | | | brick, concrete debris in fill from 4'-5' concrete debris, at 5' | | | | | |
| 5 | 30 | | B-14-4 | | | | (OLD FILL) SILTY CLAY (CL) Dark olive gray, mottled with small iron-oxide nodules, dry, stiff | | | | | |
| | | | B-14-5 | | | | | | | | | |
| | | | B-14-6 | | | | SANDY SILTY CLAY (CL) Yellow brown, damp, stiff, 20% very fine grained sand | | | | | |
| 10 | 25 | | B-14-7 | | | | moist | | | | | |
| | | | B-14-8 | | | | | | | | | |
| 15 | 20 | | B-14-9 | | | | SILTY CLAY (CL) Light yellow brown, moist, soft to firm | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 20 | 15 | | | | | | | | | | | |

Woodward-Clyde Consultants

Figure

Project: Verdese Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-15

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/10/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 16.0 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 38 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|---------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-4" LAWN 4"-6" SAND FILL (ML) | | | | | |
| | | | B-15-1 | | | | CLAYEY SILT (CL) Light brown, dry, very fine grained to fine grained, 20% clay | | | | | |
| | | | B-15-2 | | | | | | | | | |
| 35 | | | | | | | PEBBLY CLAY (CL) (FILL) Dark brown, dry, stiff, brick debris in matrix, concrete rubble at 2'-2.5' | | | | | |
| | | | B-15-3 | | | | angular concrete clasts in clay matrix, fill material (PARK FILL) (RELOC. OLD FILL?) | | | | | |
| | | | B-15-4 | | | | SILTY CLAY (CL) Brown, damp, stiff, pebbly gravel, 10% subrounded gravels 1/4" x 1/2" size | | | | | |
| 5 | | | B-15-5 | | | | | | | | | |
| | | | B-15-6 | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| | | | B-15-7 | | | | | | | | | |
| | | | B-15-8 | | | | SANDY CLAY (CL) Light yellow brown, dry, stiff, 20-30% very fine grained sand, trace pebbles | | | | | |
| 25 | | | | | | | | | | | | |
| | | | B-15-9 | | | | SILTY CLAY (CL) Light brown, damp, firm to stiff, 5-10% pebbly gravel 1/4" x 1/2" subrounded gravels | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 20 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-16

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/10/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 15.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 34 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-2" LAWN | | | | | |
| | | | B-16-1 | | | | SILTY SAND (SM) (FILL) Light brown, dry, firm, rootlets, very fine grained to fine grained sand (1978 FILL) | | | | | |
| | | | B-16-2 | | | | PEBBLY CLAY (CL) (FILL) Dark brown, dry, stiff, fragments of brick debris, rootlets filled with iron-oxide, subangular pebbly gravel 1/4" x 1/4" x 1/2" size (OLD FILL) | | | | | |
| 30 | | | B-16-3 | | | | | | | | | |
| | | | B-16-4 | | | | | | | | | |
| 5 | | | B-16-5 | | | | SILTY CLAY (CL) Grayish-olive brown, damp, firm to stiff, 20% very fine grained to fine grained sand, trace rounded pebbles to 1/8" x 1/4" size | | | | | |
| | | | B-16-6 | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 10 | | | B-16-7 | | | | | | | | | |
| | | | B-16-8 | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| 15 | | | B-16-9 | | | | SILTY SANDY CLAY (CL) Yellowish brown, damp, firm to stiff, 5% subrounded 1/4" size pebbles, 5% coarse grained sand, 20% very fine grained sand | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Woodward-Clyde Consultants

Figure

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-17

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/11/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 15.0 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|----------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-2" LAWN | | | | | |
| | | | | | | | CLAYEY SILTY SAND (SM) (FILL) | | | | | |
| | | | B-17-1 | | | | Light brown, dry, loose, very fine grained sand, 20% clay | | | | | |
| | | | | | | | CLAYEY SILT (MH) (FILL) | | | | | |
| | | | B-17-2 | | | | Dark brown, moist, soft, rootlets, worm burrows, wood debris, 30% clay | | | | | |
| 30 | | | B-17-3 | | | | (1978 FILL) | | | | | |
| | | | | | | | PEBBLY CLAY (CL) (FILL) | | | | | |
| | | | | | | | Dark brown, damp, stiff, 35% subrounded pebbly gravels | | | | | |
| | | | B-17-4 | | | | (OLD FILL) | | | | | |
| 5 | | | | | | | SILTY CLAY (CL) | | | | | |
| | | | | | | | Olive brown, moist, firm to stiff, up to 5% subrounded pebbly gravels | | | | | |
| | | | B-17-5 | | | | | | | | | |
| | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| | | | | | | | SANDY SILTY CLAY (CL) | | | | | |
| | | | | | | | Mottled olive with gray colored clay, damp, firm to stiff, trace subrounded pebbly gravels to 1/4" x 1/4" size | | | | | |
| 10 | | | B-17-6 | | | | | | | | | |
| | | | | | | | becoming stiffer | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | SILTY CLAY (CL) | | | | | |
| | | | | | | | Light yellow brown, moist, stiff, trace pebbles | | | | | |
| | | | B-17-7 | | | | | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Woodward-Clyde Consultants

Figure

Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-18

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/10/00 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 16.0 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-2" LAWN SAND (FILL) Brick debris | | | | | |
| | | | B-18-1 | | | | CLAYEY SILTY SAND (SM) Light brown, dry, very fine grained sand, 20% clay, 20% orange-red decomposed brick (1978 FILL) | | | | | |
| 30 | | | B-18-2 | | | | PEBBLY CLAY (CL) Dark brown, to black, dry, stiff, pebbles to 1.2" size, 20-30% subangular-subrounded gravels (OLD FILL) | | | | | |
| | | | B-18-3 | | | | SILTY CLAY (CL) Olive brown, stiff, damp to moist, decomposed roots | | | | | |
| 5 | | | B-18-4 | | | | | | | | | |
| | | | | | | | SANDY CLAY (CL) Olive gray, moist, firm, 20-30% very fine grained sand, rootlets turning to iron-oxide | | | | | |
| 25 | | | B-18-5 | | | | | | | | | |
| | | | | | | | SILTY CLAY (CL) Brown, mottled with gray clay, moist, stiff | | | | | |
| 10 | | | B-18-6 | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | B-18-7 | | | | | | | | | |
| | | | | | | | | | | | | |
| 15 | | | B-18-8 | | | | CLAYEY SAND (CL) Dark green gray, very moist to wet, soft, fine grained to medium grained sand, 40% clay | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Project: Verdese Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-19

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/10/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 16.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 34 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-2" LAWN | | | | | |
| | | | B-19-1 | | | | SANDY CLAYEY SILT (ML) (FILL) | | | | | |
| | | | | | | | (1978 FILL) | | | | | |
| | | | | | | | PEBBLY CLAY (CL) (FILL) | | | | | |
| | | | | | | | Dark brown to black, dry, stiff, 20-30% angular to rounded 1/4" x 1/2" x 1/2" pebbly gravels, some angular brick and concrete fragments | | | | | |
| 30 | | | B-19-2 | | | | | | | | | |
| | | | B-19-3 | | | | | | | | | |
| 5 | | | B-19-4 | | | | | | | | | |
| | | | B-19-5 | | | | (OLD FILL) | | | | | |
| | | | | | | | SILTY SANDY CLAY (CL) | | | | | |
| | | | | | | | Olive grayish brown, damp, stiff, 20% very fine grained sand, trace subrounded pebbly gravels 1/4" x 1/4" x 1/4" size | | | | | |
| 25 | | | B-19-6 | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | B-19-7 | | | | | | | | | |
| | | | | | | | SILTY CLAY (CL) | | | | | |
| | | | | | | | Olive brown, mottled with gray | | | | | |
| 20 | | | B-19-8 | | | | | | | | | |
| | | | | | | | | | | | | |
| 15 | | | B-19-9 | | | | SANDY CLAY (CL) | | | | | |
| | | | | | | | Dark greenish gray, moist, firm to stiff, 35-40% very fine grained to fine grained sand | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Woodward-Clyde Consultants

Figure

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-20

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|---------------------|--------------|----------------------------|------------------------------|
| Date(s) Drilled | 5/11/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 15.0 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | | | Surface Elevation (feet) | 33 |
| | | | | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | No lawn here, near water faucet | | | | | |
| | | B-20-1 | | | | | 2" CLAYEY SILTY SAND (SM) (FILL) Light brown (1978 FILL) | | | | | |
| 30 | | B-20-2 | | | | | PEBBLY CLAY (CL) (FILL) Very dark brown to black, damp, firm to stiff, small 1/4" x 1/4" subrounded pebbly gravels | | | | | |
| | | B-20-3 | | | | | (OLD FILL) | | | | | |
| 5 | | | | | | | SILTY CLAY (CL) Yellowish brown, mottled slightly with gray, moist, firm, very fine grained, 5% small black nodules | | | | | |
| | | B-20-4 | | | | | SANDY SILTY CLAY (CL) Olive brown, mottled with gray, moist, stiff, 20% very fine grained sand | | | | | |
| 25 | | B-20-5 | | | | | | | | | | |
| | | B-20-6 | | | | | SILTY SANDY CLAY (CL) Dark greenish gray, mottled with gray black clay, moist, firm, 25-30% very fine grained to fine grained sand | | | | | |
| 10 | | B-20-7 | | | | | SILTY CLAY (CL) Brown to olive gray, mottled with saturated to wet gray caly in burrows, moist, stiff, trace to 5% small 1/4" x 1/4" subrounded pebbly gravels | | | | | |
| 20 | | | | | | | | | | | | |
| | | B-20-8 | | | | | | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-21

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|--------------------------------|------------|
| Date(s) Drilled | 6/24/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 9.0 |
| Drill Rig Type | CME 75 | Drilled By | Great Sierra | Borehole Cement Grout Backfill | |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 36 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | 35 | | B-21-1 | | | | 0-4" LAWN CLAYEY SILT (MH) (FILL) Light brown, dry (PARK FILL) | | | | | |
| | | | B-21-2 | | | | PEBBLY CLAY (CL) (FILL) Black, dry, stiff with concrete debris fragments | | | | | |
| | | | B-21-3 | | | | | | | | | |
| 5 | 30 | | B-21-4 | | | | (OLD FILL) GRAVELLY CLAY (CL) Orange brown, soil stained gray with hydrocarbon odor | | | | | |
| | | | B-21-5 | | | | | | | | | |
| | | | B-21-6 | | | | SILTY CLAY (CL) Dark greenish gray, damp to moist, stiff, slight hydrocarbon odor | | | | | |
| 10 | 25 | | | | | | BOTTOM OF BORING | | | | | |
| 15 | 20 | | | | | | | | | | | |
| 20 | 15 | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Project: **Verdese Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-22

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|-----------------------|--------------------------|------------------------------|-----------------|
| Date(s) Drilled | 6/24/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 8.5 |
| Drill Rig Type | CME 75 | Drilled By | Great Sierra | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD | ___ ft after ___ days | Hammer Type | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | | Surface Elevation (feet) | 38 | Elevation Datum |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-4" LAWN | | | | | |
| | | | B-22-1 | | | | PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, nails, glass debris | | | | | |
| 35 | | | B-22-2 | | | | (PARK FILL) (RELOC, OLD FILL?) | | | | | |
| | | | B-22-3 | | | | PEBBLY CLAY (CL) (FILL) Very dark brown, same as above with brick and concrete debris | | | | | |
| 5 | | | | | | | Cobble size fill debris (OLD FILL) | | | | | |
| | | | | | | | SANDY SILTY CLAY (CL) Light yellow brown, damp, stiff | | | | | |
| 30 | | | B-22-4 | | | | | | | | | |
| | | | B-22-5 | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 10 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Project: **Verdese Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-23

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|---------------------|--------------|----------------------------|------------------------------|
| Date(s) Drilled | 6/24/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 8.5 |
| Drill Rig Type | CME 75 | Drilled By | Great Sierra | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | | | Surface Elevation (feet) | 38 |
| | | | | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|----------------------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-21" LAWN CLAYEY SILT Brown to dark brown topsoil | | | | | |
| | | B-23-1 | | | | | PEBBLY CLAY (CL) (FILL) Black, dry, stiff, glass debris | | | | | |
| 35 | | B-23-2 | | | | | SANDY GRAVELLY CLAY (CL) (FILL) Light gray to grayish brown, dry, hard, with glass debris | | | | | |
| | | | | | | | (PARK FILL) (RELOC. OLD FILL?) | | | | | |
| 5 | | | | | | | SILTY CLAY (CL) (FILL) Black, pebbly, dry, stiff | | | | | |
| | | B-23-3 | | | | | | | | | | |
| | | | | | | | (OLD FILL) | | | | | |
| 30 | | B-23-4 | | | | | SANDY SILTY CLAY (CL) Olive, dry, stiff | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 10 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Figure



Project: **Verdese Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-24

Sheet 1 of 1

| | | | | | |
|----------------------------|------------------------|---------------------|--------------|----------------------------|------------------------------|
| Date(s) Drilled | 6/24/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 8.5 |
| Drill Rig Type | CME 75 | Drilled By | Great Sierra | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | | | Surface Elevation (feet) | 34 |
| | | | | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|----------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-3" ASPHALT over 4" (AB) (YELLOW SILTY SANDY GRAVEL) (PARK FILL) | | | | | |
| | | | B-24-1 | | | | PEBBLY SILTY CLAY (CL) (FILL) Black, damp, firm (OLD FILL) | | | | | |
| | | | B-24-2 | | | | SILTY CLAY (CL) | | | | | |
| | | | B-24-3 | | | | Light yellow brown, mottled with gray, dry, stiff | | | | | |
| 30 | | | | | | | | | | | | |
| 5 | | | B-24-4 | | | | SILTY CLAY (CL) Light yellow brown, mottled with gray, dry, stiff | | | | | |
| | | | B-24-5 | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |

Figure

Woodward-Clyde Consultants

Project: Verdesse Carter Park
 Project Location: 98th and Bancroft, Oakland
 Project Number: 93C0243A

Log of Boring WCB-25

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 6/24/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 8.0 |
| Drill Rig Type | CME 75 | Drilled By | Great Sierra | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-----------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | B-25-1 | | | | 0-2" ASPHALT over 4" AB (YELLOW GRAVEL) (PARK FILL) | | | | | |
| | | | B-25-2 | | | | PEBBLY SILTY CLAY (CL) (FILL) Very dark brown, damp, firm to stiff | | | | | |
| | | | B-25-3 | | | | SILTY CLAY (CL) Olive brown, damp, stiff | | | | | |
| 30 | | | B-25-4 | | | | | | | | | |
| | | | B-25-5 | | | | | | | | | |
| 5 | | | B-25-6 | | | | Sample 5 full of slough; data not used | | | | | |
| | | | B-25-7 | | | | | | | | | |
| 25 | | | | | | | BOTTOM OF BORING | | | | | |
| 10 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Sheet 1 of 1

| | | | | | |
|-------------------------------|------------------------|-----------------------------|--------------|----------------------------------|--------------|
| Date(s) Drilled | 6/24/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 8.5 |
| Drill Rig Type | CME 75 | Drilled By | Great Sierra | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | _____ ft | ATD | _____ ft | after | _____ days |
| Comments | Mod. Cal Drive Sampler | Hammer Type | | Hammer Weight/ Drop (lbs/in.) | |
| | | Surface Elevation (feet) | 34 | Elevation Datum | |

[illegible]

Table 4. Summary of Results for Sulfide and Sulfate (mg/kg).

| Sample | Sulfide | Sulfate | Comments |
|---------|---------|---------|----------|
| COURT-1 | <0.20 | 2,160 | AB (C) |
| CRACK-A | <1.0 | 245,000 | PPT |
| CRACK-B | <1.0 | 295,000 | PPT |
| CRACK-C | <1.0 | 320,000 | PPT |
| CRACK-D | <1.0 | 279,000 | PPT |
| CRACK-E | <1.0 | 294,000 | PPT |
| CRACK-F | <1.0 | 289,000 | PPT |
| CRACK-G | <1.0 | 366,000 | PPT (D) |
| CRACK-H | <1.0 | 299,000 | PPT |
| CRACK-J | <1.0 | 365,000 | PPT (D) |

Note:

AB = Aggregate Base Material

PPT = Precipitate

(C) = Composite sample

(D) = Paired duplicate sample

Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-2

Sheet 1 of 1

| | | | | | |
|----------------------------|----------------------------------|--------------------------|--------------|------------------------------|--------------|
| Date(s) Drilled | 5/12/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 14.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ___ ft ATD ___ ft after ___ days | Hammer Type | | Hammer Weight/Drop (lbs/in.) | |
| Comments | Mod. Cal Drive Sampler | Surface Elevation (feet) | 33 | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|-------------|-----------------|---------|--------|---------------------|-------------|----------|-------------------------------------------------------------------------------|------------------|----------------------|---------|-----------------|---------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 3" ASPHALT OVER 3" AB (PARK FILL) | | | | | |
| | | | B-2-1 | | | | SILTY CLAY (CL) (FILL) Very dark brown, damp, stiff, 5-10% pebbly gravels | | | | | |
| 30 | | | B-2-2 | | | | (OLD FILL) SILTY CLAY (CL) Dark olive gray, damp, stiff | | | | | |
| 5 | | | B-2-3 | | | | SANDY SILTY CLAY (CL) Light brown, moist, firm, 20% very fine grained sand | | | | | |
| | | | B-2-4 | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| | | | B-2-5 | | | | SILTY CLAY (CL) Brown to grayish brown, dry, stiff, black nodules | | | | | |
| 10 | | | B-2-6 | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | B-2-7 | | | | | | | | | |
| 15 | | | | | | | BOTTOM OF BORING | | | | | |
| | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |



Project: **Verdesse Carter Park**
 Project Location: **98th and Bancroft, Oakland**
 Project Number: **93C0243A**

Log of Boring WCB-1

Sheet 1 of 1

| | | | | | |
|-------------------------------|------------------------|------------------------|--------------|-------------------------------|----------------------------------|
| Date(s) Drilled | 5/13/93 | Logged By | W. Loskutoff | Checked By | M. McGuire |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | | Total Depth Drilled (feet) | 19.5 |
| Drill Rig Type | CME 55 | Drilled By | HEW | Borehole Backfill | Cement Grout |
| Apparent Groundwater Depth | ft ATD | ft after | days | Hammer Type | Hammer Weight/ Drop (lbs/in.) |
| Comments | Mod. Cal Drive Sampler | | | Surface Elevation (feet) | 39 |
| | | | | Elevation Datum | |

| Depth, feet | Elevation, feet | SAMPLES | | | | Well Log | MATERIAL DESCRIPTION | Water Content, % | Dry Unit Weight, pcf | Qu, psf | Liquid Limit, % | Plasticity Index, % |
|----------------|--------------------|---------|--------|------------------------|-------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|---------|--------------------|------------------------|
| | | Type | Number | Sampling Resistance | Recovery, % | | | | | | | |
| 0 | | | | | | | 0-2" LAWN | | | | | |
| | | | B-1-1 | | | | 2"-4" SILTY SAND (SM) Fill, light yellow, dry, loose, very fine to fine grained | | | | | |
| | | | | | | | 6" SANDY CLAYEY SILT (MH) (FILL) Very dark brown, dry, firm, rootlets, 30-40% clay | | | | | |
| | | | B-1-2 | | | | | | | | | |
| 35 | | | | | | | (PARK FILL) | | | | | |
| | | | B-1-3 | | | | PEBBLY CLAY (CL) (FILL) Very dark brown, dry, stiff, angular gravels pebble size 1/2" x 1/4" x 1/8", some debris clasts, rootlets | | | | | |
| 5 | | | | | | | | | | | | |
| | | | B-1-4 | | | | SILTY CLAY (CL) Very dark brown, dry, stiff, trace to 5% pebbly gravels subangular to subrounded | | | | | |
| | | | | | | | | | | | | |
| | | | B-1-5 | | | | (OLD FILL) | | | | | |
| | | | | | | | SILTY CLAY (CL) Olive gray to olive brown, dry, very stiff, very fine grained sand, up to 5% pebbly gravels 1/8" x 1/8" subrounded, 5% rootlets | | | | | |
| 30 | | | | | | | | | | | | |
| | | | B-1-6 | | | | | | | | | |
| | | | B-1-7 | | | | SANDY SILTY CLAY (CL) Light yellow brown, dry, very stiff, 5% subrounded gravels, 20% very fine grained to fine grained sand | | | | | |
| | | | | | | | | | | | | |
| | | | B-1-8 | | | | GRAVELLY CLAY (CL) Yellow brown, dry to damp, stiff to dense, 30% subangular gravels to 1/2" x 1/2" x 1" size | | | | | |
| 25 | | | | | | | | | | | | |
| | | | | | | | GRAVELLY CLAYEY SAND (SC) Light brown, moist, medium dense, medium grained to coarse grained sand, 15-20% subrounded gravels to 1/2" x 1/2" size, 35-40% clay | | | | | |
| | | | B-1-9 | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | SILTY CLAY (CL) Light yellow brown, damp to moist, firm | | | | | |
| 20 | | | B-1-10 | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING | | | | | |
| 20 | | | | | | | | | | | | |

Figure

Woodward-Clyde Consultants

Quality Assurance/Quality Control Review of Chemical Data

Introduction

Soil and water samples collected for this investigation were analyzed by CKY Laboratory, located in Torrance, California and ATI Laboratory located in San Diego, California. The samples were analyzed for Title 22 metals (EPA Methods 6010/7000 series), pH (EPA Method 9045), organochlorine pesticides (EPA Method 8080), organophosphorus pesticides (EPA Method 8140), and chlorinated herbicides (EPA Method 8150). One sample was extracted using the WET citrate and the WET deionized water extraction method. The extracts were analyzed for arsenic, mercury, lead, and zinc. The soil and water analytical results for this project were submitted to a thorough QA/QC review. The review included the following:

- Holding Time Review - Check for exceedences of prescribed holding times.
- Blank Review - Review blank analyses for evidence of potential contaminants
- Spike Review - Review spike recoveries and spike duplicate relative percent differences as a check for analytical precision and accuracy.
- Duplicate Review - Review duplicate analyses for agreement of results as a check for analytical precision.
- Surrogate Review - Review surrogate recoveries for possible matrix interferences.

Each of the above QA/QC checks is discussed in detail in this section.

Holding Time Review

Analytical methods used for this study have an associated prescribed holding time, that is the maximum amount of time after collection that a sample may be held prior to extraction and/or analysis. Sample integrity becomes questionable for samples extracted and/or analyzed outside of the holding times owing to physical and chemical changes to the sample such as degradation or volatilization. Results of such analyses are suspect. The holding times for all samples for all analyses were reviewed. Holding times were met for each of the analyses.

Blank Review

Blank samples are analyzed in order to check for potential sample contamination. Information regarding the source of contamination may also be gained by analyzing a variety of blanks prepared at several points during sample collection and analysis. The blanks analyzed for this project included the following:

- Method Blanks - Deionized, distilled water that is extracted and analyzed as a sample. Analysis of the method blank indicates potential sources of contamination from laboratory sources (e.g. contaminated reagents, improperly cleaned laboratory equipment, or persistent contamination due to presence of certain compounds in the ambient laboratory air). method blank was analyzed for each analytical method at least once every day that the method was used.
- Equipment Blanks - A blank that is prepared in the field by pouring distilled water into sampling equipment, then into sample containers. Usually, the equipment blank is submitted to the laboratory 'blind' (under a fictitious location designation).

Analysis of the equipment blank indicates potential sources of contamination of samples from improperly cleaned sampling equipment or sample containers or from ambient air contamination. One equipment blank was collected with the groundwater samples. The equipment blanks were analyzed for full the suite of analyses.

The reported method blanks were ND for each of the analyses. Thus, laboratory conditions are considered acceptable. One equipment was collected and labeled VCPEQB. The equipment blank was analyzed for the full suite of analyses. The results for the equipment blank were ND. Thus, equipment decontamination procedures are considered acceptable.

Spike Review

Spikes are performed in order to evaluate the efficiency of the sample extraction and analysis procedures. Spikes are performed in the form of matrix spikes and reagent spikes. Matrix spikes are necessary as matrix interference (that is, interferences from the sample matrix - water, soil, or other) which may have widely varying impacts on the accuracy and precision of the extraction and analysis. The matrix spike is prepared by the addition of known quantities of target analytes to a sample. The sample is extracted and analyzed. The results of the analysis are compared with the known additions and a matrix spike recovery is calculated. The recovery gives an evaluation of the accuracy of the extraction and analysis procedures. Typically matrix spikes are performed in duplicate in order to also evaluate the precision of the methods. Matrix spike recoveries are reviewed to check that they are within acceptable range. However, the acceptable ranges vary widely according to analytical method and matrix. The reagent spike, sometimes referred to as Laboratory Control Sample (LCS) are necessary to monitor accuracy only. The reagent spike is prepared similarly to the matrix spike, except a control (contaminant free) matrix is used in place of the sample matrix. The recovery of the reagent spike gives an evaluation of laboratory accuracy independent of matrix interferences.

The matrix spike recoveries for metals ranged from 0 to 290 percent. Some recoveries were outside the project defined control limits. However, the laboratory noted that in each case where a matrix spike recovery was outside of the limits, the corresponding LCS recovery was within the limit. The laboratory therefore attributed each of the recoveries outside of the project accuracy limits to matrix interference. Samples with out of limit matrix spike recoveries listed on Table 1 should be viewed as estimated values, as the detected result may have been subject to matrix interference. The matrix spike recoveries for the organic analyses (Method 8080, 8140, and 8150) ranged from 0 to 128 percent. Sample B-9-1 Method 8150 matrix spike recovery for phorate was 0 percent and was outside control limits. The laboratory considered this to be an anomalous result because the associated LCS and surrogate recoveries were acceptable. The LCS recovery ranges were within the project established acceptable ranges, for each of the analyses as were the other matrix spike recoveries. Laboratory accuracy is considered acceptable.

Typically reagent spikes are performed in duplicate in order to also evaluate the precision of the methods using reagent spike duplicate recovery relative percent differences (RPDs) calculated as:

$$RPD = [(Result\ 1 - Result\ 2) / (Average\ of\ Result\ 1\ and\ Result\ 2)] \times 100$$

The reported matrix spike duplicate recovery RPDs for organic analyses ranged from 7 to 25 percent. The RPD's indicate acceptable precision. It should be noted inorganic precision was assessed through laboratory duplicate analyses.

Duplicate Analyses

Analysis of duplicates gives an evaluation of sampling and analytical precision. Laboratory duplicates (duplicate analyses performed on two aliquots of the same sample) reflect analytical precision which field duplicates (two samples collected at the same time and the same station in the field) reflect both sampling and analytical precision as well as sample media heterogeneity. Field duplicates are generally submitted to the laboratory "blind" (with a fictitious name so that the laboratory does not know they are duplicates).

The laboratory performed metal and pH analyses in duplicate, to evaluate precision and matrix homogeneity. The metal RPD's ranged from 0 to 61 percent, see Table 2. The laboratory attributed the out of limit RPD's to matrix (soil) and target compound heterogeneity. The pH RPD's ranged from 0 to 2 percent, indicating acceptable precision and minimal to no heterogeneity for pH.

Eighteen blind duplicate soil samples were collected and analyzed for a variety of analyses. Each of the duplicate pairs are listed on Table 3. Also included on Table 3, are the detection limit, detected concentration, and calculated RPD. Blind duplicate metal RPD's ranged from 0 to 179 percent. Duplicate analyses again showed compound stratification and matrix heterogeneity. Data associated with an RPD above 30 percent should be viewed as an estimated value, as the compound is likely stratified within the matrix. The duplicate metal results indicate compound and matrix heterogeneity. The pH RPD's ranged from 0 to 36 percent. The RPD's above 20 percent represent heterogeneous samples. The organic analysis results were each reported to be ND. Thus results are in agreement.

Surrogate Recoveries

Surrogates are organic compounds which are similar to the analytes of interest in chemical behavior, but which are not normally found in environmental samples. Surrogates are added to samples to monitor the effect of the matrix on the accuracy of the analysis. Surrogates are only used for organic analyses. Results are reported in terms of percent recovery. The reported surrogate recoveries for this investigation were within laboratory established limits. Matrix interferences should be considered minimal for the organic analyses.

QA/QC Summary

The data for the investigation has been subjected to an extensive QA/QC review, and has been found to be of satisfactory quality with limitations. Holding times were met for all sample analyses. No evidence of method blank contamination was found in any method blank analyses. Equipment blank sample VCPEQB was reported to be ND, thus equipment decontamination procedures are considered acceptable. The matrix spike analyses indicate matrix interference for metal analyses. Matrix spike and spike duplicate analyses for organic analyses indicate minimal to little matrix interference and acceptable accuracy. Laboratory and blind duplicate samples were not completely in agreement for metal analyses, indicating likely compound stratification and matrix heterogeneity. Surrogate recoveries were within laboratory established limits, indicating minimal to no matrix effect on the analysis results.

In summary, the results of the QA/QC review show that the data set has acceptable analytical accuracy and precision, with limitations to the use of the metals data due to compound stratification and matrix heterogeneity.

Table 1. Matrix Spike Recoveries Outside of Project Limits

| Sample I.D. | Method | Compound | Recovery | Limit |
|-------------|---------------|----------|----------|----------|
| B-25-1 | EPA 6010/7000 | Arsenic | 40 | 75 - 125 |
| | EPA 6010/7000 | Lead | 39 | 75 - 125 |
| B-21-1 | EPA 6010/7000 | Arsenic | 50 | 75 - 125 |
| B-15-2 | EPA 6010/7000 | Lead | 190 | 75 - 125 |
| B-5-1 | EPA 6010/7000 | Arsenic | -25 | 75 - 125 |
| | EPA 6010/7000 | Lead | -100 | 75 - 125 |
| | EPA 6010/7000 | Zinc | 163 | 75 - 125 |
| B-7-1 | EPA 6010/7000 | Antimony | 39 | 75 - 125 |
| | EPA 6010/7000 | Arsenic | 138 | 75 - 125 |
| | EPA 6010/7000 | Barium | 290 | 75 - 125 |
| | EPA 6010/7000 | Selenium | 0 | 75 - 125 |
| | EPA 8150 | Phorate | 0 | 40 - 140 |
| B-15-4 | EPA 6010/7000 | Antimony | 37 | 75 - 125 |
| | EPA 6010/7000 | Copper | 48 | 75 - 125 |
| | EPA 6010/7000 | Selenium | 41 | 75 - 125 |
| B-21-2 | EPA 6010/7000 | Lead | 61 | 75 - 125 |

Table 2. Laboratory RPDs Outside of Project Limits

| Sample I.D. | Method | Compound | RPD (a) | Limit |
|-------------|---------------|----------|---------|-------|
| B-5-1 | EPA 6010/7000 | Arsenic | 41 | 20 |
| | EPA 6010/7000 | lead | 81 | 20 |
| B-8-4 | EPA 6010/7000 | Zinc | 29 | 20 |
| B-7-1 | EPA 6010/7000 | Arsenic | 21 | 20 |
| | EPA 6010/7000 | Barium | 61 | 20 |
| | EPA 6010/7000 | Chromium | 25 | 20 |
| | EPA 6010/7000 | Vanadium | 34 | 20 |
| B-15-2 | EPA 6010/7000 | Lead | 30 | 20 |
| B-15-4 | EPA 6010/7000 | Cobalt | 25 | 20 |
| | EPA 6010/7000 | Copper | 47 | 20 |
| | EPA 6010/7000 | Zinc | 23 | 20 |
| B-25-1 | EPA 6010/7000 | Arsenic | 40 | 20 |
| | EPA 6010/7000 | Lead | 39 | 20 |
| B-21-2 | EPA 6010/7000 | Arsenic | 50 | 20 |

a - Relative percent difference

Table 3. Carter Park Blind Field Soil Duplicate RPDs

| Sample I.D.s | Parameter | Detection Limit mg/kg | Detected Values mg/kg | | RPD (a) |
|-----------------|------------|--------------------------|--------------------------|------|---------|
| B-2-3/ B-2-4 | pH | - | 7.32 | 7.30 | 0 |
| | Lead | 5 | 5.78 | 8.8 | 2 |
| | Zinc | 5 | 44.1 | 44.4 | 8 |
| B-5-5/ B-5-6 | pH | - | 8.14 | 8.14 | 0 |
| | Lead | 5 | 10.1 | 8.4 | 18 |
| | Zinc | 5 | 49.7 | 51.2 | 3 |
| B-12-4/ B-12-5 | Lead | 5 | 185 | 502 | 92 |
| | Zinc | 5 | 127 | 95.5 | 28 |
| B-4-5/ B-4-6 | Lead | 5 | 6.09 | 6.37 | 4 |
| | Zinc | 5 | 53 | 62.9 | 17 |
| B-1-6/ B-1-7 | pH | - | 8.23 | 8.25 | 0 |
| B-4-4/ B-4-5 | pH | - | 7.05 | 7.5 | 6 |
| B-16-2/B-2-3 | Antimony | 15 | ND | ND | - |
| | Arsenic | 5 | ND | ND | - |
| | Barium | 2.5 | 240 | 148 | 47 |
| | Beryllium | 0.75 | ND | ND | - |
| | Cadmium | 1 | ND | ND | - |
| | Chromium | 2.5 | 6.3 | 52.4 | 157 |
| | Cobalt | 2.5 | 10.2 | 8.91 | 14 |
| | Copper | 1 | 40.7 | 38.7 | 5 |
| | Lead | 5 | 8.87 | 6.97 | 24 |
| | Mercury | 0.05 | ND | ND | - |
| | Molybdenum | 2.5 | ND | ND | - |
| | Nickel | 2.5 | 44.4 | 39.2 | 12 |
| | Selenium | 15 | ND | ND | - |
| | Silver | 1 | ND | ND | - |
| | Thallium | 20 | ND | ND | - |
| | Vanadium | 2.5 | 62.5 | 43.9 | 35 |
| | Zinc | 5 | 52.4 | 49.7 | 5 |
| B-7-3/ B-7-4 | pH | - | 7.69 | 7.71 | 0 |
| | Arsenic | 5 | ND | ND | - |
| | Lead | 5 | ND | 7.92 | - |
| | Zinc | 5 | 72.9 | 63.6 | 14 |
| B-15-4 / B-15-5 | pH | - | 7.43 | 7.58 | 2 |
| B-16-2 / B-16-3 | pH | - | 7.44 | 6.99 | 6 |
| B-6-3 / B-6-4 | pH | - | 7.90 | 7.87 | 0 |

Table 3. Carter Park Blind Field Soil Duplicate RPDs, concluded

| Sample I.D.s | Parameter | Detection Limit mg/kg | Detected Values mg/kg | | RPD (a) |
|-----------------|------------|--------------------------|--------------------------|------|---------|
| B-3-4/ B-3-5 | pH | - | 7.59 | 7.66 | 1 |
| | Arsenic | 5 | ND | ND | - |
| | Lead | 5 | 9.59 | 6.86 | 32 |
| | Zind | 5 | 51.2 | 54.5 | 6 |
| B-3-1/ B-3-2 | 8080 | 0.010 - 0.10 | ND | ND | - |
| | 8140 | 0.050 - 0.10 | ND | ND | - |
| | 8150 | 0.005 - 4.0 | ND | ND | - |
| | pH | - | 3.87 | 5.58 | 36 |
| | Antimony | 15 | ND | ND | - |
| | Arsenic | 5 | 18.8 | 8.1 | 80 |
| | Barium | 2.5 | 224 | 244 | 90 |
| | Beryllium | 0.75 | ND | - | - |
| | Cadmium | 1 | ND | - | - |
| | Chromium | 2.5 | 59.1 | 60.5 | 2 |
| | Cobalt | 2.5 | 4.78 | 9.2 | 65 |
| | Copper | 1 | 78.3 | 38.5 | 68 |
| | Lead | 5 | 13.2 | 10.9 | 19 |
| | Mercury | 0.05 | ND | 0.06 | - |
| | Molybdenum | 2.5 | ND | ND | - |
| | Nickel | 2.5 | 30.6 | 44.5 | 37 |
| | Selenium | 15 | ND | ND | - |
| | Silver | 1 | ND | ND | - |
| | Thallium | 20 | ND | ND | - |
| | Vanadium | 2.5 | 67.2 | 66.7 | 1 |
| | Zinc | 5 | 299 | 326 | 9 |
| B-24-2 / B-24-3 | pH | - | 5.27 | 8.7 | 28 |
| | Arsenic | 5 | 34.2 | 5.86 | 119 |
| | Lead | 5 | 10.7 | 44.1 | 58 |
| | Zinc | 5 | 51.7 | | 16 |
| B-22-2 / B-22-3 | pH | - | 7.94 | 7.86 | 1 |
| | Arsenic | 5 | 5.59 | ND | - |
| | Lead | 5 | 319 | 18 | 179 |
| | Zinc | 5 | 42.4 | 47.9 | 12 |
| B-20-4 / B-20-5 | pH | - | 8.13 | 8.10 | .0 |
| B-14-5 / B-14-6 | pH | - | 7.57 | 7.67 | 1 |
| B-13-5 / B-13-6 | pH | - | 8.05 | 8.04 | 0 |

a - Relative percent difference

RPD = (difference between values)/(average of values)*100

cc: McGuire
Anita Q
Jackie L



CKY incorporated Analytical Laboratories

Date: 06/28/93
93E057

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 946075

Attn: Mr. Michael McGuire

Subject: Additional Laboratory Report
Project: Carter Park/93C0243A.1

Enclosed is the additional laboratory report for samples received on 05/14/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. Additional analyses were requested on 06/11/93. The data reported includes:

| <u>Method</u> | <u>No. of Analysis</u> |
|--------------------------------|------------------------|
| EPA 3050/6010 by ICP (Pb & Zn) | 34 Soils |
| EPA 3050/6010 by GFAA (As) | 12 Soils |

The results are summarized on forty pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

A handwritten signature in cursive script, appearing to read 'K Y Pang', written over a horizontal line.

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

CASE NARRATIVE

CLIENT: WOODWARD-CLYDE CONSULTANTS
PROJECT: CARTER PARK
CKY BATCH: 93E057

Additional metal analyses for samples received on 05/14/93 were requested on 06/10/93. The analyses were in accordance with SW 846, USEPA 3rd Edition, 1986. Results were reported on wet weight basis.

1. Samples were homogenized before preparation for metal analyses according to instruction in the memo dated 06/10/93.
2. Metal analyses by Method 3050/6010/7000

Arsenic was analyzed by GFAA in most samples except 93E057-16, 64, and 73. These samples were analyzed by ICP because of the high As concentration. Lead and Zinc were analyzed by ICP. Method blanks, lab control samples, and calibrations were all within the control limits. Two sets of matrix spikes were analyzed. Recoveries in one set (93E057-67) were all within QC limit. In another matrix spike (93E057-16), all recoveries were out of QC limit. Their post digestive spikes were within QC criteria. The inhomogeneous samples with high metal concentrations were probably the cause. No corrective action was taken.

Two sets of duplicate samples were analyzed. As and Pb were outliers in sample 93E057-16 and Zn was an outlier in sample 93E057-67. The sample was re-analyzed and similar results were obtained. Since the method blank, lab control sample and lab control sample duplicates were all within control, no corrective action was taken.

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants  DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                     DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-9-2                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-02                  MATRIX:         Soil
% MOISTURE:   NA                        DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 5.71 |
| Zinc | 5 | 36.8 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-9-3                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-03                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 6.32 |
| Zinc | 5 | 55.6 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-9-4                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-04                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 7.14 |
| Zinc | 5 | 43.3 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                        DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-2-2                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-10                     MATRIX:         Soil
% MOISTURE:  NA                            DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 5.78 |
| Zinc | 5 | 44.1 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-2-3                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-11                     MATRIX:         Soil
% MOISTURE:  NA                            DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 8.8 |
| Zinc | 5 | 44.4 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-2-4                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-12                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 8.94 |
| Zinc | 5 | 48.3 |

EPA METHOD 3050/6010
METALS BY ICP

=====

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/12/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/14/93 |
| BATCH NO.: | 93E057 | DATE EXTRACTED: | 06/15/93 |
| SAMPLE ID: | B-2-5 | DATE ANALYZED: | 06/24/93 |
| CONTROL NO.: | 93E057-13 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

=====

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 8.43 |
| Zinc | 5 | 52.6 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-5-1                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-16                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic | 5 | 388 |
| Lead | 5 | 496 |
| Zinc | 5 | 328 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                      DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-5-3                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-18                   MATRIX:         Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 7.45 |
| Zinc | 5 | 36 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                     DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-5-5                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-20                  MATRIX:         Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 10.1 |
| Zinc | 5 | 49.7 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-5-6                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-21                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 8.4 |
| Zinc | 5 | 51.2 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-5-7                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-22                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 9.02 |
| Zinc | 5 | 63.3 |

EPA METHOD 3050/6010
METALS BY ICP

=====

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/12/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/14/93 |
| BATCH NO.: | 93E057 | DATE EXTRACTED: | 06/15/93 |
| SAMPLE ID: | B-10-1 | DATE ANALYZED: | 06/24/93 |
| CONTROL NO.: | 93E057-25 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

=====

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 10.2 |
| Lead | 5 | 52.7 |
| Zinc | 5 | 164 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-10-3                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-27                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 7.43 |
| Lead | 5 | 37.6 |
| Zinc | 5 | 75.7 |

**Analyzed by GFAA



EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-1-1                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-36                   MATRIX:         Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 11.1 |
| Lead | 5 | 116 |
| Zinc | 5 | 94.7 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-1-2                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-37                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 10.4 |
| Lead | 5 | 39.9 |
| Zinc | 5 | 140 |

**Analyzed by GFAA



EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-1-4                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-39                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 8.21 |
| Zinc | 5 | 41.8 |



EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-1-5                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-40                     MATRIX:        Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | ND |
| Zinc | 5 | 41.1 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-1-7                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-42                     MATRIX:         Soil
% MOISTURE:  NA                            DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 7.57 |
| Zinc | 5 | 54.2 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                     DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-11-2                     DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-47                  MATRIX:        Soil
% MOISTURE:   NA                        DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | 27.4 |
| Lead | 5 | 46.3 |
| Zinc | 5 | 108 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

=====

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/12/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/14/93 |
| BATCH NO.: | 93E057 | DATE EXTRACTED: | 06/15/93 |
| SAMPLE ID: | B-12-1 | DATE ANALYZED: | 06/24/93 |
| CONTROL NO.: | 93E057-55 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

=====

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 29.1 |
| Zinc | 5 | 61.7 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                     DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-12-2                     DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-56                  MATRIX:         Soil
% MOISTURE:   NA                        DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 6.65 |
| Lead | 5 | 105 |
| Zinc | 5 | 108 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

=====

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/12/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/14/93 |
| BATCH NO.: | 93E057 | DATE EXTRACTED: | 06/15/93 |
| SAMPLE ID: | B-12-4 | DATE ANALYZED: | 06/24/93 |
| CONTROL NO.: | 93E057-58 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

=====

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 185 |
| Zinc | 5 | 127 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                     DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-12-5                     DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-59                  MATRIX:         Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 502 |
| Zinc | 5 | 95.5 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-12-7                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-61                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 8.8 |
| Zinc | 5 | 78.7 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                      DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-8-1                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-64                   MATRIX:        Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic | 5 | 450 |
| Lead | 5 | 481 |
| Zinc | 5 | 309 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                     DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-8-3                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-66                  MATRIX:         Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 6.49 |
| Zinc | 5 | 38.4 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-8-4                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-67                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 6.24 |
| Lead | 5 | 7.1 |
| Zinc | 5 | 33 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/12/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/14/93 |
| BATCH NO.: | 93E057 | DATE EXTRACTED: | 06/15/93 |
| SAMPLE ID: | B-8-5 | DATE ANALYZED: | 06/24/93 |
| CONTROL NO.: | 93E057-68 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | 5.45 |
| Lead | 5 | 6.16 |
| Zinc | 5 | 40.7 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                      DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-4-1                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-73                   MATRIX:        Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic | 5 | 458 |
| Lead | 5 | 144 |
| Zinc | 5 | 432 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                      DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-4-3                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-75                   MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 7.42 |
| Zinc | 5 | 57.1 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                       DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-4-4                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-76                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 9.85 |
| Zinc | 5 | 44.6 |

EPA METHOD 3050/6010
METALS BY ICP

=====

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/12/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/14/93 |
| BATCH NO.: | 93E057 | DATE EXTRACTED: | 06/15/93 |
| SAMPLE ID: | B-4-5 | DATE ANALYZED: | 06/24/93 |
| CONTROL NO.: | 93E057-77 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

=====

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 6.09 |
| Zinc | 5 | 53 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/12/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/14/93
BATCH NO.:   93E057                     DATE EXTRACTED: 06/15/93
SAMPLE ID:   B-4-6                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E057-78                  MATRIX:         Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 6.37 |
| Zinc | 5 | 62.9 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:   NA
BATCH NO.:   93E057                       DATE EXTRACTED:  06/15/93
SAMPLE ID:   METHOD BLANK 1                 DATE ANALYZED:   06/24/93
CONTROL NO.: 933050 E057-BLK1              MATRIX:         Soil
% MOISTURE:  NA                            DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | ND |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:   NA
BATCH NO.:   93E057                        DATE EXTRACTED:  06/15/93
SAMPLE ID:   METHOD BLANK 2                 DATE ANALYZED:   06/29/93
CONTROL NO.: 933050 E057-BLK2              MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR:  1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | ND |

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

=====

| | | | |
|--------------|----------------------|-----------------|----------|
| BATCH NO.: | 93E057 | DATE RECEIVED: | NA |
| SAMPLE ID: | LCS 216 | DATE EXTRACTED: | 06/15/93 |
| CONTROL NO.: | 93E057-LCS1 and LCS2 | DATE ANALYZED: | 06/24/93 |
| ACCESSION: | 93E057 | | |

| Parameter | TRUE VALUE (mg/kg) | LCS1 FOUND VALUE (mg/kg) | LCS2 FOUND VALUE (mg/kg) | RPD (%) | ACCEPTANCE RA (mg/kg) |
|-----------|-----------------------|--------------------------------|--------------------------------|------------|--------------------------|
| ----- | ----- | ----- | ----- | --- | ----- |
| Arsenic | 67.7 | 75.3 | 75.9 | 1 | 41 - 105 |
| Lead | 100 | 86.0 | 90.4 | 5 | 55 - 140 |
| Zinc | 197 | 173 | 182 | 5 | 98 - 280 |

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
JECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E057 DATE RECEIVED: 05/12/93
SAMPLE ID: B-5-1 DATE EXTRACTED: 06/15/93
CONTROL NO.: 93E057-16 DATE ANALYZED: 06/24/93
ACCESSION: 93E057

| Parameter | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|-----------|-----------------------------|---------------------------------|----------------------|
| Arsenic | 388 | 257 | 41 + |
| Lead | 496 | 211 | 81 + |
| Zinc | 328 | 370 | 12 |

+ Outside control limit of 20%

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E057
SAMPLE ID: B-5-1
CONTROL NO.: 93E057-16
DATE RECEIVED: 05/12/93
DATE EXTRACTED: 06/15/93
DATE ANALYZED: 06/24/93
ACCESSION: 93E057

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|-----------|--------------------------|------------------------|-------------------------|---------------------|
| Arsenic | 388 | 100 | 363 | -25 + |
| Lead | 496 | 100 | 396 | -100 + |
| Zinc | 328 | 100 | 491 | 163 + |

+ Outside control limit of 75-125%

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
EPA ID: EPA 3050/6010
MATRIX: Soil

| | | | |
|--------------|-----------|-----------------|----------|
| ATCH NO.: | 93E057 | DATE RECEIVED: | 05/12/93 |
| SAMPLE ID: | B-8-4 | DATE EXTRACTED: | 06/15/93 |
| CONTROL NO.: | 93E057-67 | DATE ANALYZED: | 06/24/93 |
| CESSION: | 93E057 | | |

| Parameter | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|-----------|-----------------------------|---------------------------------|----------------------|
| ----- | ----- | ----- | ----- |
| Arsenic** | 6.24 | 6.02 | 4 |
| Lead | 7.1 | 8.25 | 15 |
| Inc | 33 | 44.4 | 29 + |

Analyzed by GFAA
Outside control limit of 20%

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

=====

| | | | |
|--------------|-----------|-----------------|----------|
| BATCH NO.: | 93E057 | DATE RECEIVED: | 05/12/93 |
| SAMPLE ID: | B-8-4 | DATE EXTRACTED: | 06/15/93 |
| CONTROL NO.: | 93E057-67 | DATE ANALYZED: | 06/24/93 |
| ACCESSION: | 93E057 | | |

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|-----------|--------------------------|------------------------|-------------------------|---------------------|
| ----- | ----- | ----- | ----- | ----- |
| Arsenic** | 6.24 | 100 | 93.4 | 87 |
| Lead | 7.1 | 100 | 91.9 | 85 |
| Cadmium | 33 | 100 | 125 | 92 |

*Analyzed by GFAA

CKY



CKY incorporated
Analytical Laboratories

cc McGuire
Anita Q
Jackie L

Date: 06/29/93
93E048

Woodward-Clyde Consultants
500-12th Street, Suite 100
Oakland, CA 94607

Attn: Mr. Michael McGuire

Subject: Additional Laboratory Report
Project: Carter Park #93C0243A

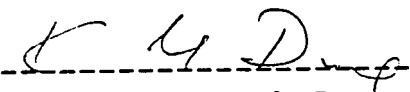
Enclosed is the laboratory report for samples received on 05/12/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. Additional analyses were requested on 06/10/93. The data reported includes:

| <u>Method</u> | <u>No. of Analysis</u> |
|--------------------------------|------------------------|
| EPA 3050/6010 by ICP (Pb & Zn) | 13 Soils |
| EPA 3050/6010 by GFAA (As) | 6 Soils |

The results are summarized on seventeen pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,



Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed of after fifteen (15) days from the date of this report.

CASE NARRATIVE

CLIENT: WOODWARD-CLYDE CONSULTANTS
PROJECT: CARTER PARK
CKY BATCH: 93E048

Additional metal analyses for samples received on 05/12/93 were requested on 06/10/93. The analyses were in accordance SW 846, USEPA 3rd Edition, 1986. Results were reported on wet weight basis.

1. Samples were homogenized before preparation for metal analyses according to instruction in the memo dated 06/10/93.
2. Metal analyses by Method 3050/6010/7000

Arsenic was analyzed by GFAA. Lead and Zinc were analyzed by ICP. Method blanks, lab control samples and calibrations were all within the control limits. Matrix spike recovery of Lead was negative due to the high lead concentration in the sample. No corrective action was taken.

In duplicate sample analyses, Arsenic and Lead were out of the project specific QC limit of 20%. The sample was re-analyzed and similar results were obtained. Since the method blank, lab control sample and lab control sample duplicates were all within control, no corrective action was taken.

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                        DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-15-2                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-02                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 8.4 |
| Lead | 5 | 1520 |
| Zinc | 5 | 91.9 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                        DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-15-3                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-03                     MATRIX:        Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 8.1 |
| Zinc | 5 | 44 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                     DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-16-1                     DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-10                  MATRIX:        Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 138 |
| Zinc | 5 | 65.4 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-19-1                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-19                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 11.6 |
| Zinc | 5 | 64.4 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-19-4                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-22                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 7.48 |
| Zinc | 5 | 61.5 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                      DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-19-6                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-24                   MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 8.22 |
| Zinc | 5 | 44.3 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                      DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-14-1                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-51                   MATRIX:         Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| Lead | 5 | 13.3 |
| Zinc | 5 | 60.3 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-14-3                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-53                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 6700 |
| Zinc | 5 | 132 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                      DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-14-4                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-54                   MATRIX:         Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 6.26 |
| Zinc | 5 | 49.6 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-14-5                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-55                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Lead | 5 | 7.6 |
| Zinc | 5 | 51.7 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-13-2                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-61                     MATRIX:        Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 6.05 |
| Zinc | 5 | 39.8 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-13-3                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-62                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det. Limit (mg/kg) | RESULT (mg/kg) |
|-----------|-----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | 42.6 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-13-4                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E048-63                     MATRIX:         Soil
% MOISTURE:  NA                             DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 6.22 |
| Zinc | 5 | 55.9 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:   NA
BATCH NO.:   93E048                        DATE EXTRACTED:  06/14/93
SAMPLE ID:   METHOD BLANK                   DATE ANALYZED:   06/24/93
CONTROL NO.: 93E048-BLK                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | ND |

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
EPA ID: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064 DATE RECEIVED: 05/12/93
SAMPLE ID: B-15-2 DATE EXTRACTED: 06/14/93
CONTROL NO.: 93E048-02 DATE ANALYZED: 06/24/93

ACCESSION: 93E048 93E064

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|-----------|--------------------------|------------------------|-------------------------|---------------------|
| arsenic** | 8.4 | 100 | 85.6 | 77 |
| lead | 1520 | 100 | 1330 | -190 + |
| zinc | 91.9 | 100 | 191 | 99 |

**Analyzed by GFAA
- Outside control limit of 75-125%

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

ATCH NO.: 93E064 DATE RECEIVED: NA
AMPLE ID: LCS 216 DATE EXTRACTED: 06/14/93
ONTROL NO.: 93E064-LCS1 and LCS2 DATE ANALYZED: 06/24/93
CESSION: 93E048 93E064

| Parameter | TRUE VALUE (mg/kg) | LCS1 FOUND VALUE (mg/kg) | LCS2 FOUND VALUE (mg/kg) | RPD (%) | ACCEPTANCE RANGE (mg/kg) |
|-----------|-----------------------|--------------------------------|--------------------------------|------------|-----------------------------|
| Asenic | 67.7 | 75.4 | 67.3 | 11 | 41 - 105 |
| Lead | 100 | 91.1 | 81.5 | 11 | 55 - 140 |
| Inc | 197 | 180 | 167 | 8 | 98 - 280 |



CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

| | | | |
|--------------|---------------|-----------------|----------|
| ATCH NO.: | 93E048 | DATE RECEIVED: | 05/12/93 |
| SAMPLE ID: | B-15-2 | DATE EXTRACTED: | 06/14/93 |
| CONTROL NO.: | 93E048-02 | DATE ANALYZED: | 06/24/93 |
| ACCESSION: | 93E048 93E064 | | |

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|-----------|--------------------------|------------------------|-------------------------|---------------------|
| arsenic** | 8.4 | 100 | 85.6 | 77 |
| lead | 1520 | 100 | 1330 | -190 + |
| inc | 91.9 | 100 | 191 | 99 |

*Analyzed by GFAA
Outside control limit of 75-125%

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
EPA ID: EPA 3050/6010
MATRIX: Soil

=====

| | | | |
|--------------|----------------------|-----------------|----------|
| TECH NO.: | 93E048 | DATE RECEIVED: | NA |
| SAMPLE ID: | LCS 216 | DATE EXTRACTED: | 06/14/93 |
| CONTROL NO.: | 93E048-LCS1 and LCS2 | DATE ANALYZED: | 06/24/93 |
| ACCESSION: | 93E048 93E064 | | |

| | TRUE VALUE | LCS1 FOUND VALUE | LCS2 FOUND VALUE | RPD | ACCEPTANCE RANGE |
|-----------|------------|---------------------|---------------------|-----|------------------|
| Parameter | (mg/kg) | (mg/kg) | (mg/kg) | (%) | (mg/kg) |
| ----- | ----- | ----- | ----- | --- | ----- |
| Arsenic | 67.7 | 75.4 | 67.3 | 11 | 41 - 105 |
| Lead | 100 | 91.1 | 81.5 | 11 | 55 - 140 |
| Zinc | 197 | 180 | 167 | 8 | 98 - 280 |

ANALYSIS REQUEST FORM

(G3)

DUE 6-17-93

CLIENT NAME:

WCC / Carter Park

CKY CONTROL NO.:

93E048

REQUESTED BY:

M. H. Smith

DATE:

6/10/93

LOGGED BY:

Cecilia Chavez

CKY CONTROL NO.

CLIENT SAMPLE ID

COMMENTS

93E048 - 2. ✓

B-15-2

Pb, Zn (ICP) / Arsenic (GFAA)

E048 - 3 ✓

B-15-3

" " "

E048 - 10. ✓

B-16-1

Pb, Zn (ICP)

E048 - 22 -

B-19-4

E048 - 24 -

B-19-6

E048 - 19 ✓

B-19-1

Pb, Zn (ICP) / Arsenic (GFAA)

E048 - 25

B-14-5

Pb, Zn (ICP)

E048 - 53 -

B-14-3

E048 - 54 -

B-14-4

E048 - 51 -

B-14-1

E048 - 55 -

B-14-5

E048 - 61 ✓

B-13-2

Pb, Zn (ICP) / Arsenic (GFAA)

E048 - 62 ✓

B-13-3

E048 - 63 ✓

B-13-4

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
EPA ID: EPA 3050/6010
MATRIX: Soil

ATCH NO.: 93E048 DATE RECEIVED: 05/12/93
AMPLE ID: B-15-2 DATE EXTRACTED: 06/14/93
CONTROL NO.: 93E048-02 DATE ANALYZED: 06/24/93
ACCESSION: 93E048 93E064

| Parameter | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|-----------|-----------------------------|---------------------------------|----------------------|
| arsenic** | 8.4 | ND | - + |
| lead | 1520 | 1130 | 30 + |
| inc | 91.9 | 110 | 18 |

*Analyzed by GFAA
Outside control limit of 20%

317373

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

OBJECT NO.

13C 0243A

SAMPLERS: (Signature)

Leta Vuong

ANALYSES

Sample Matrix
(Soil, Water, Air)

EPA Method

EPA Method

EPA Method

EPA Method

As, Pb, Zn

pH

Number of Containers

REMARKS

(Sample
preservation,
handling
procedures, etc.)

DATE

TIME

SAMPLE NUMBER

7/30 12:10 Crack A

12:11 Crack B

12:15 Crack C

12:15 Crack D

12:30 Crack E

12:30 Crack F

12:35 Crack G

12:35 Crack H

12:35 Crack J

S

V

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

X

~~72-hour~~ AP~~Rush~~~~samples~~

Results

Michael

McGuire

WCC-Oakland

510/874-3262

*As- by

GF-AA

*Standard

turn

around

1000 pHTOTAL
NUMBER OF
CONTAINERS

9

RELINQUISHED BY:
(Signature)

DATE/TIME

7/30/15

RECEIVED BY:
(Signature)RELINQUISHED BY:
(Signature)

DATE/TIME

RECEIVED BY:
(Signature)

METHOD OF SHIPMENT:

SHIPPED BY:
(Signature)COURIER:
(Signature)RECEIVED FOR LAB BY:
(Signature)

DATE/TIME

Federal Express

Michael McGuire

7/30/15 1000

93E048 DUE 5- -93

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. CARTER PARK
93C0243A

SAMPLERS: (Signature)

Bill [Signature]

ANALYSES

| DATE | TIME | SAMPLE NUMBER | Sample Matrix (Soil, Water, Air) | EPA Method | EPA Method | EPA Method | EPA Method | HOLD pending analysis request | PH 9040/9045 | HOMOGENIZE | Number of Containers | REMARKS (Sample preservation, handling procedures, etc.) |
|---------|------|---------------|-------------------------------------|------------|------------|------------|------------|----------------------------------|--------------|------------|----------------------|-----------------------------------------------------------------------------------------|
| 5/4/93 | 1646 | B-18-2 | S | | | | | X | X | X | 1 | All samples in brass or SS liners HOLD samples pending analysis request |
| | 1654 | B-18-3 | S | | | | | X | | | 1 | |
| | 1659 | B-18-4 | S | | | | | X | X | | 1 | |
| | 1707 | B-18-5 | S | | | | | X | X | | 1 | |
| | 1713 | B-18-6 | S | | | | | X | X | | 1 | |
| | 1723 | B-18-7 | S | | | | | X | X | | 1 | |
| | 1730 | B-18-8 | S | | | | | X | | | 1 | |
| 5/11/93 | 0902 | B-17-1 | S | | | | | X | X | | 1 | 3 week TAT Contact Mike McGuire (510) 874-3288 |
| | 0914 | B-17-2 | S | | | | | X | X | X | 1 | |
| | 0922 | B-17-3 | S | | | | | X | | | 1 | |
| | 0929 | B-17-4 | S | | | | | X | X | | 1 | |
| | 0942 | B-17-5 | S | | | | | X | X | | 1 | |
| | 0948 | B-17-6 | S | | | | | X | X | | 1 | |
| | 0958 | B-17-7 | S | | | | | X | | | 1 | |
| | 1045 | B-20-1 | S | | | | | X | X | | 1 | |
| | 1057 | B-20-2 | S | | | | | X | X | X | 1 | |
| | 1104 | B-20-3 | S | | | | | X | X | | 1 | |
| | 1112 | B-20-4 | S | | | | | X | X | | 1 | |
| | 1120 | B-20-5 | S | | | | | X | X | | 1 | |
| | 1125 | B-20-6 | S | | | | | X | X | | 1 | |
| | 1132 | B-20-7 | S | | | | | X | X | | 1 | |
| | 1143 | B-20-8 | S | | | | | X | | | 1 | |
| | 1254 | B-14-1 | S | | | | | X | X | | 1 | |
| | 1302 | B-14-2 | S | | | | | X | X | X | 1 | |
| | 1331 | B-14-3 | S | | | | | X | X | | 1 | |
| | 1347 | B-14-4 | S | | | | | X | X | | 1 | |
| | 1401 | B-14-5 | S | | | | | X | X | | 1 | |
| | 1406 | B-14-6 | S | | | | | X | X | | 1 | T=60c |

TOTAL
NUMBER OF
CONTAINERS

28

RELINQUISHED BY:
(Signature)

Bill [Signature]

DATE/TIME

5/11/93 1845

RECEIVED BY:
(Signature)

[Signature]

RELINQUISHED BY:
(Signature)

DATE/TIME

1

RECEIVED BY:
(Signature)

METHOD OF SHIPMENT:

SHIPPED BY:
(Signature)

[Signature]

COURIER:
(Signature)RECEIVED FOR LAB BY:
(Signature)

DATE/TIME

5-12

FEDERAL EXPRESS AIRMAIL
63-871/8703/87-871592

ANALYTICAL LABORATORIES, 630 Maple Ave., Torrance, Calif 90503 Tel. (310) 618-8889 Fax (310) 618-0818

PROJECT NO.

93C0243A

SAMPLERS: (Signature)

Bill [Signature]

DATE TIME SAMPLE NUMBER

Sample Matrix
(Soil, Water, Air)

EPA Method
EPA Method
EPA Method
EPA Method

ANALYSES

HOLD pending analysis request
TITLE 22 METALS
PH 9040/9045
HOMOGENIZE

Number of Containers

REMARKS
(Sample preservation, handling procedures, etc.)

| | | | | | | | | | | | | | | | | |
|---------|------|--------|---|--|--|--|--|---|--|--|--|--|--|--|--|---|
| 5/10/93 | 0940 | B-15-1 | S | | | | | X | | | | | | | | 1 |
| | 0950 | B-15-2 | S | | | | | X | | | | | | | | 1 |
| | 1010 | B-15-3 | S | | | | | X | | | | | | | | 1 |
| | 1020 | B-15-4 | S | | | | | X | | | | | | | | 1 |
| | 1035 | B-15-5 | S | | | | | X | | | | | | | | 1 |
| | 1045 | B-15-6 | S | | | | | X | | | | | | | | 1 |
| | 1052 | B-15-7 | S | | | | | X | | | | | | | | 1 |
| | 1101 | B-15-8 | S | | | | | X | | | | | | | | 1 |
| | 1110 | B-15-9 | S | | | | | X | | | | | | | | 1 |
| | 1238 | B-16-1 | S | | | | | X | | | | | | | | 1 |
| | 1254 | B-16-2 | S | | | | | X | | | | | | | | 1 |
| | 1258 | B-16-3 | S | | | | | X | | | | | | | | 1 |
| | 1302 | B-16-4 | S | | | | | X | | | | | | | | 1 |
| | 1310 | B-16-5 | S | | | | | X | | | | | | | | 1 |
| | 1319 | B-16-6 | S | | | | | X | | | | | | | | 1 |
| | 1328 | B-16-7 | S | | | | | X | | | | | | | | 1 |
| | 1338 | B-16-8 | S | | | | | X | | | | | | | | 1 |
| | 1347 | B-16-9 | S | | | | | X | | | | | | | | 1 |
| | 1440 | B-19-1 | S | | | | | X | | | | | | | | 1 |
| | 1450 | B-19-2 | S | | | | | X | | | | | | | | 1 |
| | 1504 | B-19-3 | S | | | | | X | | | | | | | | 1 |
| | 1512 | B-19-4 | S | | | | | X | | | | | | | | 1 |
| | 1519 | B-19-5 | S | | | | | X | | | | | | | | 1 |
| | 1525 | B-19-6 | S | | | | | X | | | | | | | | 1 |
| | 1533 | B-19-7 | S | | | | | X | | | | | | | | 1 |
| | 1543 | B-19-8 | S | | | | | X | | | | | | | | 1 |
| | 1554 | B-19-9 | S | | | | | X | | | | | | | | 1 |
| V | 1635 | B-18-1 | S | | | | | X | | | | | | | | 1 |

All samples in
brass or stainless
steel 2"x6" or
2 1/2"x6" liners

HOLD Samples
pending analysis
request

3 week TAT

Contact
Mike McGuire
(510) 874-3288

T=6°C

TOTAL
NUMBER OF
CONTAINERS

28

RELINQUISHED BY:
(Signature)

Bill [Signature]

DATE/TIME

5/11/93 1845

RECEIVED BY:
(Signature)

[Signature]

RELINQUISHED BY:
(Signature)

DATE/TIME

RECEIVED BY:
(Signature)

METHOD OF SHIPMENT:

FED Express
AIRBILL #

SHIPPED BY:
(Signature)

FOR: FED EX

COURIER:
(Signature)

RECEIVED FOR LAB BY:
(Signature)

[Signature]

DATE/TIME

5-12-93 2:52pm

6258918463/6258918342

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607
(415) 893-3600

- 4014

Chain of Custody Record

G:

PROJECT NO. *Center Park*
93C0243A

SAMPLERS: (Signature)

Bill [Signature]

ANALYSES

Sample Matrix
(Soil, Water, Air)

EPA Method

EPA Method

EPA Method

EPA Method

HOLD pending analysis request

TITLE 22 METHODS

pH 9040/9045

HOMOGENIZE

Number of Containers

REMARKS
(Sample preservation, handling procedures, etc.)

DATE TIME SAMPLE NUMBER

| | | |
|--------|------|--------|
| 5/1/93 | 1411 | B-14-7 |
| | 1419 | B-14-8 |
| | 1430 | B-14-9 |
| | 1515 | B-13-1 |
| | 1525 | B-13-2 |
| | 1532 | B-13-3 |
| | 1548 | B-13-4 |
| | 1558 | B-13-5 |
| | 1607 | B-13-6 |
| | 1612 | B-13-7 |
| | 1618 | B-13-8 |
| ✓ | 1628 | B-13-9 |

S S S S S S S S S S S S S

X X X X X X X X X X X X X

X X X X X X X X X X X X X

X X X X X X X X X X X X X

1 1 1 1 1 1 1 1 1 1 1 1 1

All samples in
brass or stainless
steel 2"x6" or
2 1/2"x6" liners

HOLD samples
pending
analysis
request

3 week TAT

Contact
Mike McGuire
(510) 874-3288

T=6°C

TOTAL
NUMBER OF
CONTAINERS

12

RELINQUISHED BY:
(Signature)

DATE/TIME

RECEIVED BY:
(Signature)

RELINQUISHED BY:
(Signature)

DATE/TIME

RECEIVED BY:
(Signature)

METHOD OF SHIPMENT:

SHIPPED BY:
(Signature)

COURIER:
(Signature)

RECEIVED FOR LAB BY:
(Signature)

DATE/TIME

Fed Ex AIRBILL #
535 02/8403/6352-1839

EX

CRY INC., ANALYTICAL LABORATORIES, 630 Maple Ave., Torrance, Calif. 90503 Tel. (310) 618-8889 Fax. (310) 618-0018



CKY incorporated Analytical Laboratories

Date: 06/03/93
93E064

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Attn: Mr. Michael McGuire

Subject: Laboratory Report
Project: Carter Park

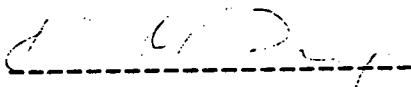
Enclosed is the laboratory report for samples received on 05/15/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

| <u>Method</u> | <u>No. of Analysis</u> |
|--------------------|------------------------|
| EPA 608/8080 | 1 Water/4 Soils |
| EPA 8140 | 1 Water/4 Soils |
| EPA 8150 | 1 Water/4 Soils |
| EPA 3050/6010/7000 | 4 Soils |
| EPA 9045 | 21 Soils |

The results are summarized on thirty-six pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,



Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

EPA METHOD 608 - PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED:  05/19/93
SAMPLE ID:   VCPEQB                     DATE ANALYZED:   05/24/93
CONTROL NO:  93E064-25                 MATRIX TYPE:     Water
=====
```

| <u>PARAMETERS (608)</u> | <u>RESULTS</u> <u>(ug/L)</u> | <u>DETECTION LIMIT</u> <u>(ug/L)</u> |
|-------------------------|---------------------------------|-----------------------------------------|
| Alpha-BHC | ND | 0.05 |
| gama-BHC (Lindane) | ND | 0.05 |
| Heptachlor | ND | 0.05 |
| Aldrin | ND | 0.05 |
| beta-BHC | ND | 0.05 |
| delta-BHC | ND | 0.05 |
| Heptachlor Epoxide | ND | 0.05 |
| Endosulfan I | ND | 0.1 |
| gamma-Chlordane | ND | 0.5 |
| alpha-Chlordane | ND | 0.5 |
| DDE | ND | 0.1 |
| Dieldrin | ND | 0.1 |
| Endrin | ND | 0.1 |
| DDD | ND | 0.1 |
| Endosulfan II | ND | 0.1 |
| DDT | ND | 0.1 |
| Endrin aldehyde | ND | 0.1 |
| Methoxychlor | ND | 0.5 |
| Endosulfan Sulfate | ND | 0.1 |
| Endrin Ketone | ND | 0.1 |
| Toxaphene | ND | 1.0 |

% Surrogate Recovery

Acceptable Range

Tetrachloro-m-xylene
Decachlorobiphenyl

106 30-150
124 24-154

CASE NARRATIVE

CLIENT: WOODWARD CLYDE CONSULTANTS
PROJECT: CARTER PARK
CKY BATCH: 93E064

Twenty-four (24) soil and one (1) water samples were received on 05/15/93 for analyses by EPA methods 8080, 8140, 8150, 9045 and metals in accordance with SW 846, USEPA 3rd Edition, 1986. Results are reported on wet weight basis.

1. Samples were homogenized before preparation for various chemical analyses according to instruction in the memo dated 05/15/93.

2. EPA Method 8080 (Pesticides)

Holding time, system performance, method blank, lab control sample, and surrogate recoveries were all within Quality Control limit. Matrix spike and matrix spike duplicate analyses were within QC limit.

3. EPA Method 8140

Holding time, system performance, method blank, lab control sample, surrogate recoveries were all within Quality Control limit. Matrix spike of phorate had no recovery. However, recoveries of disulfoton and surrogate were within the recommended range and lab control sample was within control. No corrective action was taken. Matrix effect was suspected.

4. EPA Method 8150

Holding time, system performance, method blank, lab control sample, surrogate recoveries, matrix spike and matrix spike duplicate analyses were all within QC limit.

5. Metal analyses by Method 3050/6010/7000

Arsenic was analyzed by GFAA, Mercury was analyzed by cold vapor. All other elements were analyzed by ICP. Method blanks, lab control samples, blank spikes, and calibrations were all within control limit. Matrix spike recoveries of Antimony, Copper, Zinc and Selenium were out of the QC limit of 75-125%. Since the blank spike, lab control sample and post digestive spike results were within control, matrix effect or inhomogeneous samples were suspected. No corrective action was taken.

In duplicate sample analyses, Arsenic, Barium, Chromium and Vanadium were out of the project specific QC limit of 20%. The sample was re-analyzed and similar results were obtained. Since the method blank and lab control sample were within control and only four out of seventeen metals were affected, the cause of discrepancy may be due to something other than the analytical process.

6. EPA Method 9045

Calibration and duplicates were all within control.

EPA METHOD 8080 - PESTICIDES

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/18/93 |
| SAMPLE ID: | B-7-1 | DATE ANALYZED: | 05/24/93 |
| CONTROL NO: | 93E064-1 | MATRIX TYPE: | Soil |

| PARAMETERS (8080) | RESULTS (ug/kg) | DETECTION LIMIT (ug/kg) |
|--------------------|--------------------|----------------------------|
| Alpha-BHC | ND | 10 |
| gama-BHC (Lindane) | ND | 10 |
| Heptachlor | ND | 20 |
| Aldrin | ND | 20 |
| beta-BHC | ND | 20 |
| delta-BHC | ND | 20 |
| Heptachlor Epoxide | ND | 20 |
| Endosulfan I | ND | 50 |
| gamma-Chlordane | ND | 50 |
| alpha-Chlordane | ND | 20 |
| DDE | ND | 20 |
| Dieldrin | ND | 20 |
| Endrin | ND | 20 |
| DDD | ND | 50 |
| Endosulfan II | ND | 20 |
| DDT | ND | 50 |
| Endrin aldehyde | ND | 100 |
| Methoxychlor | ND | 50 |
| Endosulfan Sulfate | ND | 50 |
| Endrin Ketone | ND | 100 |
| Toxaphene | ND | |

| % Surrogate Recovery | Acceptable Range | |
|----------------------|------------------|--------|
| Tetrachloro-m-xylene | 93 | 20-150 |
| Decachlorobiphenyl | 127 | 20-150 |

EPA METHOD 608 - PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED:  05/19/93
SAMPLE ID:   Method Blank               DATE ANALYZED:   05/24/93
CONTROL NO:  93E064                    MATRIX TYPE:     Water
=====
```

| <u>PARAMETERS (608)</u> | <u>RESULTS (ug/L)</u> | <u>DETECTION LIMIT (ug/L)</u> |
|-------------------------|-----------------------|-------------------------------|
| Alpha-BHC | ND | 0.05 |
| gama-BHC (Lindane) | ND | 0.05 |
| Heptachlor | ND | 0.05 |
| Aldrin | ND | 0.05 |
| beta-BHC | ND | 0.05 |
| delta-BHC | ND | 0.05 |
| Heptachlor Epoxide | ND | 0.05 |
| Endosulfan I | ND | 0.1 |
| gamma-Chlordane | ND | 0.5 |
| alpha-Chlordane | ND | 0.5 |
| DDE | ND | 0.1 |
| Diieldrin | ND | 0.1 |
| Endrin | ND | 0.1 |
| DDD | ND | 0.1 |
| Endosulfan II | ND | 0.1 |
| DDT | ND | 0.1 |
| Endrin aldehyde | ND | 0.1 |
| Methoxychlor | ND | 0.5 |
| Endosulfan Sulfate | ND | 0.1 |
| Endrin Ketone | ND | 0.1 |
| Toxaphene | ND | 1.0 |

% Surrogate Recovery

Acceptable Range

| | | |
|----------------------|-----|--------|
| Tetrachloro-m-xylene | 89 | 30-150 |
| Decachlorobiphenyl | 142 | 24-154 |

EPA METHOD 8080 - PESTICIDES

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/18/93 |
| SAMPLE ID: | B-3-1 | DATE ANALYZED: | 05/24/93 |
| CONTROL NO: | 93E064-17 | MATRIX TYPE: | Soil |

| <u>PARAMETERS (8080)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|------------------------|--------------------------------|
| Alpha-BHC | ND | 10 |
| gama-BHC (Lindane) | ND | 10 |
| Heptachlor | ND | 20 |
| Aldrin | ND | 20 |
| beta-BHC | ND | 20 |
| delta-BHC | ND | 20 |
| Heptachlor Epoxide | ND | 20 |
| Endosulfan I | ND | 50 |
| gamma-Chlordane | ND | 50 |
| alpha-Chlordane | ND | 20 |
| DDE | ND | 20 |
| Dieldrin | ND | 20 |
| Endrin | ND | 20 |
| DDD | ND | 50 |
| Endosulfan II | ND | 20 |
| DDT | ND | 50 |
| Endrin aldehyde | ND | 100 |
| Methoxychlor | ND | 50 |
| Endosulfan Sulfate | ND | 50 |
| Endrin Ketone | ND | 100 |
| Toxaphene | ND | |

% Surrogate Recovery

| |
|----------------------|
| Tetrachloro-m-xylene |
| Decachlorobiphenyl |

Acceptable Range

| | |
|-----|--------|
| 103 | 20-150 |
| 140 | 20-150 |

EPA METHOD 8080 - PESTICIDES

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/18/93 |
| SAMPLE ID: | B-6-1 | DATE ANALYZED: | 05/24/93 |
| CONTROL NO: | 93E064-10 | MATRIX TYPE: | Soil |

| <u>PARAMETERS (8080)</u> | <u>RESULTS</u> <u>(ug/kg)</u> | <u>DETECTION LIMIT</u> <u>(ug/kg)</u> |
|--------------------------|----------------------------------|------------------------------------------|
| Alpha-BHC | ND | 10 |
| gama-BHC (Lindane) | ND | 10 |
| Heptachlor | ND | 20 |
| Aldrin | ND | 20 |
| beta-BHC | ND | 20 |
| delta-BHC | ND | 20 |
| Heptachlor Epoxide | ND | 20 |
| Endosulfan I | ND | 20 |
| gamma-Chlordane | ND | 50 |
| alpha-Chlordane | ND | 50 |
| DDE | ND | 20 |
| Dieldrin | ND | 20 |
| Endrin | ND | 20 |
| DDD | ND | 20 |
| Endosulfan II | ND | 50 |
| DDT | ND | 20 |
| Endrin aldehyde | ND | 50 |
| Methoxychlor | ND | 100 |
| Endosulfan Sulfate | ND | 50 |
| Endrin Ketone | ND | 50 |
| Toxaphene | ND | 100 |

| % Surrogate Recovery | Acceptable Range | |
|----------------------|------------------|--------|
| Tetrachloro-m-xylene | 92 | 20-150 |
| Decachlorobiphenyl | 126 | 20-150 |

EPA METHOD 8080 - PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED:  05/18/93
SAMPLE ID:   Method Blank                DATE ANALYZED:   05/24/93
CONTROL NO:  93E064                     MATRIX TYPE:     Soil
=====
```

| <u>PARAMETERS (8080)</u> | <u>RESULTS</u> <u>(ug/kg)</u> | <u>DETECTION LIMIT</u> <u>(ug/kg)</u> |
|--------------------------|----------------------------------|------------------------------------------|
| Alpha-BHC | ND | 10 |
| gamma-BHC (Lindane) | ND | 10 |
| Heptachlor | ND | 20 |
| Aldrin | ND | 20 |
| beta-BHC | ND | 20 |
| delta-BHC | ND | 20 |
| Heptachlor Epoxide | ND | 20 |
| Endosulfan I | ND | 20 |
| gamma-Chlordane | ND | 50 |
| alpha-Chlordane | ND | 50 |
| DDE | ND | 20 |
| Dieldrin | ND | 20 |
| Endrin | ND | 20 |
| DDD | ND | 20 |
| Endosulfan II | ND | 50 |
| DDT | ND | 20 |
| Endrin aldehyde | ND | 50 |
| Methoxychlor | ND | 100 |
| Endosulfan Sulfate | ND | 50 |
| Endrin Ketone | ND | 50 |
| Toxaphene | ND | 100 |

% Surrogate Recovery

Acceptable Range

Tetrachloro-m-xylene
Decachlorobiphenyl

90 20-150
127 20-150

EPA METHOD 8080 - PESTICIDES

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/18/93 |
| SAMPLE ID: | B-3-2 | DATE ANALYZED: | 05/24/93 |
| CONTROL NO: | 93E064-18 | MATRIX TYPE: | Soil |

| <u>PARAMETERS (8080)</u> | <u>RESULTS</u> <u>(ug/kg)</u> | <u>DETECTION LIMIT</u> <u>(ug/kg)</u> |
|--------------------------|----------------------------------|------------------------------------------|
| Alpha-BHC | ND | 10 |
| gamma-BHC (Lindane) | ND | 10 |
| Heptachlor | ND | 20 |
| Aldrin | ND | 20 |
| beta-BHC | ND | 20 |
| delta-BHC | ND | 20 |
| Heptachlor Epoxide | ND | 20 |
| Endosulfan I | ND | 20 |
| gamma-Chlordane | ND | 50 |
| alpha-Chlordane | ND | 50 |
| DDE | ND | 20 |
| Dieldrin | ND | 20 |
| Endrin | ND | 20 |
| DDD | ND | 20 |
| Endosulfan II | ND | 50 |
| DDT | ND | 20 |
| Endrin aldehyde | ND | 50 |
| Methoxychlor | ND | 100 |
| Endosulfan Sulfate | ND | 50 |
| Endrin Ketone | ND | 50 |
| Toxaphene | ND | 100 |

% Surrogate Recovery

Acceptable Range

Tetrachloro-m-xylene
Decachlorobiphenyl

| | |
|-----|--------|
| 88 | 20-150 |
| 130 | 20-150 |

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:    05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED: 05/20/93
SAMPLE ID:   Method Blank               DATE ANALYZED:  05/26/93
CONTROL NO:  93E064-Blk                 MATRIX:       Water
=====
```

| <u>PARAMETERS (8140)</u> | <u>RESULTS (ug/L)</u> | <u>DETECTION LIMIT (ug/L)</u> |
|--------------------------|-----------------------|-------------------------------|
| Dichlorovos | ND | 50 |
| Phosdrin | ND | 50 |
| Ethoprop | ND | 50 |
| Naled | ND | 100 |
| Phorate | ND | 50 |
| Demeton | ND | 100 |
| Diazinon | ND | 50 |
| Disulfoton | ND | 50 |
| Methyl parathion | ND | 50 |
| Ronnel | ND | 50 |
| Chlorpyrifos | ND | 50 |
| Fenthion | ND | 50 |
| Merphos | ND | 50 |
| Stirophos | ND | 100 |
| Tokuthion | ND | 100 |
| Fensulfothion | ND | 100 |
| Suprofos | ND | 50 |
| Azinphos Methyl | ND | 500 |
| Coumaphos | ND | 100 |

% Surrogate Rec.

Accept. Range

Triphenol Phosphate

82

(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:    05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED: 05/20/93
SAMPLE ID:   VCPEQB                     DATE ANALYZED:  05/26/93
CONTROL NO:  93E064-25                  MATRIX:       Water
=====
```

| <u>PARAMETERS (8140)</u> | <u>RESULTS (ug/L)</u> | <u>DETECTION LIMIT (ug/L)</u> |
|--------------------------|-----------------------|-------------------------------|
| Dichlorovos | ND | 50 |
| Phosdrin | ND | 50 |
| Ethoprop | ND | 50 |
| Naled | ND | 100 |
| Phorate | ND | 50 |
| Demeton | ND | 100 |
| Diazinon | ND | 50 |
| Disulfoton | ND | 50 |
| Methyl parathion | ND | 50 |
| Ronnel | ND | 50 |
| Chlorpyrifos | ND | 50 |
| Fenthion | ND | 50 |
| Merphos | ND | 50 |
| Stirophos | ND | 100 |
| Tokuthion | ND | 100 |
| Fensulfothion | ND | 100 |
| Suprofos | ND | 50 |
| Azinphos Methyl | ND | 500 |
| Coumaphos | ND | 100 |

% Surrogate Rec.

Accept. Range

| | | |
|---------------------|-----|----------|
| Triphenol Phosphate | 108 | (20-140) |
|---------------------|-----|----------|

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:    05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-6-1                      DATE ANALYZED:  05/26/93
CONTROL NO:  93E064-10                  MATRIX:       Soil
=====
```

| <u>PARAMETERS (8140)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|------------------------|--------------------------------|
| Dichlorovos | ND | 50 |
| Phosdrin | ND | 50 |
| Ethoprop | ND | 50 |
| Naled | ND | 100 |
| Phorate | ND | 50 |
| Demeton | ND | 100 |
| Diazinon | ND | 50 |
| Disulfoton | ND | 50 |
| Methyl parathion | ND | 50 |
| Ronnel | ND | 50 |
| Chlorpyrifos | ND | 50 |
| Fenthion | ND | 50 |
| Merphos | ND | 50 |
| Stirophos | ND | 100 |
| Tokuthion | ND | 100 |
| Fensulfothion | ND | 100 |
| Suprofos | ND | 50 |
| Azinphos Methyl | ND | 500 |
| Coumaphos | ND | 100 |

% Surrogate Rec.

Accept. Range

Triphenol Phosphate

77

(20-140)

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED:  05/18/93
SAMPLE ID:   B-7-1                     DATE ANALYZED:   05/26/93
CONTROL NO:  93E064-1                  MATRIX:         Soil
=====
```

| <u>PARAMETERS (8140)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|------------------------|--------------------------------|
| Dichlorovos | ND | 50 |
| Phosdrin | ND | 50 |
| Ethoprop | ND | 50 |
| Naled | ND | 100 |
| Phorate | ND | 50 |
| Demeton | ND | 100 |
| Diazinon | ND | 50 |
| Disulfoton | ND | 50 |
| Methyl parathion | ND | 50 |
| Ronnel | ND | 50 |
| Chlorpyrifos | ND | 50 |
| Fenthion | ND | 50 |
| Merphos | ND | 100 |
| Stirophos | ND | 100 |
| Tokuthion | ND | 100 |
| Fensulfothion | ND | 50 |
| Suprofos | ND | 500 |
| Azinphos Methyl | ND | 100 |
| Coumaphos | ND | |

% Surrogate Rec.

Accept. Range

Triphenol Phosphate

79

(20-140)

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
ID: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064 DATE RECEIVED: 05/12/93
SAMPLE ID: B-15-2 DATE EXTRACTED: 06/14/93
CONTROL NO.: 93E048-02 DATE ANALYZED: 06/24/93
ACCESSION: 93E048 93E064

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|-----------|--------------------------|------------------------|-------------------------|---------------------|
| Arsenic** | 8.4 | 100 | 85.6 | 77 |
| Lead | 1520 | 100 | 1330 | -190 + |
| Zinc | 91.9 | 100 | 191 | 99 |

*Analyzed by GFAA
- Outside control limit of 75-125%



CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

ATCH NO.: 93E064 DATE RECEIVED: 05/12/93
SAMPLE ID: B-15-2 DATE EXTRACTED: 06/14/93
CONTROL NO.: 93E048-02 DATE ANALYZED: 06/24/93
ACCESSION: 93E048 93E064

| PARAMETER | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|-----------|-----------------------------|---------------------------------|----------------------|
| arsenic** | 8.4 | ND | - + |
| lead | 1520 | 1130 | 30 + |
| inc | 91.9 | 110 | 18 |

*Analyzed by GFAA
Outside control limit of 20%



EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:   NA
BATCH NO.:   93E064                       DATE EXTRACTED:  06/14/93
SAMPLE ID:   METHOD BLANK                  DATE ANALYZED:   06/24/93
CONTROL NO.: 93E064-BLK                   MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | ND |

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

ATCH NO.: 93E064 DATE RECEIVED: NA
AMPLE ID: LCS 216 DATE EXTRACTED: 06/14/93
ONTROL NO.: 93E064-LCS1 and LCS2 DATE ANALYZED: 06/24/93
CESSION: 93E048 93E064

| Parameter | TRUE VALUE (mg/kg) | LCS1 FOUND VALUE (mg/kg) | LCS2 FOUND VALUE (mg/kg) | RPD (%) | ACCEPTANCE RANGE (mg/kg) |
|-----------|-----------------------|--------------------------------|--------------------------------|------------|-----------------------------|
| arsenic | 67.7 | 75.4 | 67.3 | 11 | 41 - 105 |
| lead | 100 | 91.1 | 81.5 | 11 | 55 - 140 |
| inc | 197 | 180 | 167 | 8 | 98 - 280 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                        DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-3-5                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-21                     MATRIX:         Soil
% MOISTURE:  NA                            DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 6.86 |
| Zinc | 5 | 54.5 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-3-6                        DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-22                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 9.73 |
| Zinc | 5 | 59.9 |

**Analyzed by GFAA



EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-3-3                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-19                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 6.97 |
| Zinc | 5 | 52.3 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/14/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/15/93 |
| BATCH NO.: | 93E064 | DATE EXTRACTED: | 06/14/93 |
| SAMPLE ID: | B-3-4 | DATE ANALYZED: | 06/24/93 |
| CONTROL NO.: | 93E064-20 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 9.49 |
| Zinc | 5 | 51.2 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-7-GRB                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-08                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 5.52 |
| Zinc | 5 | 27.6 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-6-GRB                      DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-09                    MATRIX:        Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | 26.7 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                        DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-7-4                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-04                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 7.92 |
| Zinc | 5 | 63.6 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                       DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-7-5                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-05                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 6.67 |
| Zinc | 5 | 50.4 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                      DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-7-2                       DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-02                   MATRIX:        Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 5.39 |
| Zinc | 5 | 62 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                        DATE EXTRACTED: 06/14/93
SAMPLE ID:   B-7-3                         DATE ANALYZED:  06/24/93
CONTROL NO.: 93E064-03                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | 72.9 |

**Analyzed by GFAA

cc: McGuire
Anita Q
Lester L



CKY incorporated Analytical Laboratories

Date: 06/29/93
93E064

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

Attn: Mr. Michael McGuire

Subject: Additional Laboratory Report
Project: Carter Park #93C0243A

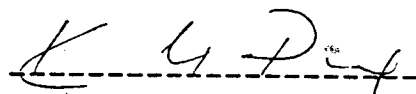
Enclosed is the laboratory report for samples received on 05/15/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. Additional analyses were requested on 06/10/93. The data reported includes:

| <u>Method</u> | <u>No. of Analysis</u> |
|--------------------------------|------------------------|
| EPA 3050/6010 by ICP (Pb & Zn) | 10 Soils |
| EPA 3050/6010 by GFAA (As) | 10 Soils |

The results are summarized on fourteen pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,



Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

CASE NARRATIVE

CLIENT: WOODWARD-CLYDE CONSULTANTS
PROJECT: CARTER PARK
CKY BATCH: 93E064

Additional metal analyses for samples received on 05/15/93 were requested on 06/10/93. The analyses were in accordance with SW 846, USEPA 3rd Edition, 1986. Results were reported on wet weight basis.

1. Samples were homogenized before preparation for metal analyses according to instruction in the memo dated 06/10/93.
2. Metal analyses by Method 3050/6010/7000

Arsenic was analyzed by GFAA. Lead and Zinc were analyzed by ICP. Method blanks, lab control samples and calibrations were all within the control limits. Matrix spike recovery of Lead was negative due to the high lead concentration in the sample. No corrective action was taken.

In duplicate sample analyses, Arsenic and Lead were out of the project specific QC limit of 20%. The sample was re-analyzed and similar results were obtained. Since the method blank, lab control sample and lab control sample duplicates were all within control, no corrective action was taken.

93E048

DUE 5- -93

CKY Lab

2 of 3

G

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO. CARTER PARK
93C0243A

SAMPLERS: (Signature)

Bill [Signature]

DATE TIME SAMPLE NUMBER

Sample Matrix
(Soil, Water, Air)

ANALYSES

Number of Containers

REMARKS
(Sample preservation, handling procedures, etc.)

| DATE | TIME | SAMPLE NUMBER | Sample Matrix (Soil, Water, Air) | EPA Method | EPA Method | EPA Method | EPA Method | HOLD pending analysis request | TITLE 22 METALS | pH 9040/9045 | (B) HOMOGENIZE | Number of Containers | REMARKS (Sample preservation, handling procedures, etc.) |
|---------|------|---------------|-------------------------------------|------------|------------|------------|------------|----------------------------------|-----------------|--------------|----------------|----------------------|-----------------------------------------------------------------------------------------|
| 5/14/93 | 1646 | B-18-2 | S | | | | | X | X | X | X | 1 | All samples in brass or SS liners HOLD samples pending analysis request |
| | 1654 | B-18-3 | S | | | | | X | | | | 1 | |
| | 1659 | B-18-4 | S | | | | | X | | X | | 1 | |
| | 1707 | B-18-5 | S | | | | | X | | X | | 1 | |
| | 1713 | B-18-6 | S | | | | | X | | X | | 1 | |
| | 1723 | B-18-7 | S | | | | | X | | X | | 1 | |
| | 1730 | B-18-8 | S | | | | | X | | | | 1 | |
| 5/11/93 | 0902 | B-17-1 | S | | | | | X | | X | | 1 | 3 week TAT |
| | 0914 | B-17-2 | S | | | | | X | X | X | | 1 | |
| | 0922 | B-17-3 | S | | | | | X | | | | 1 | |
| | 0929 | B-17-4 | S | | | | | X | | X | | 1 | |
| | 0942 | B-17-5 | S | | | | | X | | X | - | 1 | |
| | 0948 | B-17-6 | S | | | | | X | | X | | 1 | |
| | 0958 | B-17-7 | S | | | | | X | | | | 1 | |
| | 1045 | B-20-1 | S | | | | | X | | X | | 1 | Contact Mike McGuire (510) 874-3288 |
| | 1057 | B-20-2 | S | | | | | X | X | X | X | 1 | |
| | 1104 | B-20-3 | S | | | | | X | | X | | 1 | |
| | 1112 | B-20-4 | S | | | | | X | | X | | 1 | |
| | 1120 | B-20-5 | S | | | | | X | | X | | 1 | |
| | 1125 | B-20-6 | S | | | | | X | | X | | 1 | |
| | 1132 | B-20-7 | S | | | | | X | | X | | 1 | |
| | 1143 | B-20-8 | S | | | | | X | | | | 1 | |
| | 1254 | B-14-1 | S | | | | | X | | X | | 1 | T=60C |
| | 1302 | B-14-2 | S | | | | | X | X | X | X | 1 | |
| | 1331 | B-14-3 | S | | | | | X | | X | | 1 | |
| | 1347 | B-14-4 | S | | | | | X | | X | | 1 | |
| | 1401 | B-14-5 | S | | | | | X | | X | | 1 | |
| | 1406 | B-14-6 | S | | | | | X | | X | | 1 | |

TOTAL
NUMBER OF
CONTAINERS

28

RELINQUISHED BY:
(Signature)

DATE/TIME

5/11/93 1845

RECEIVED BY:
(Signature)RELINQUISHED BY:
(Signature)

DATE/TIME

RECEIVED BY:
(Signature)

METHOD OF SHIPMENT:

SHIPPED BY:
(Signature)COURIER:
(Signature)RECEIVED FOR LAB BY:
(Signature)

DATE/TIME

5-12
-93 2:50pmFED Express AIRMAIL
63589/18403/625891852FOR: FED
EX

660

Chain of Custody Record

(415) 893-3600

- 4014

| PROJECT NO. Carter Park 93C0243A | | | Sample Matrix (Soil, Water, Air) | ANALYSES | | | | | | | Number of Containers | REMARKS (Sample preservation, handling procedures, etc.) | |
|-----------------------------------------------------------------|---------|----------------------|---------------------------------------------------|------------|---------------------------------|------------|--------------------------------------------|-------------------------------|-----------------------------|--------------|----------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| SAMPLERS: (Signature) <i>Bill [Signature]</i> | | | | EPA Method | EPA Method | EPA Method | EPA Method | HOLD pending analysis results | TITLE 22 METALS | pH 9040/9045 | | | B HOMOGENIZE |
| DATE | TIME | SAMPLE NUMBER | | | | | | | | | | | |
| 57 | 5/11/93 | 1411 | B-14 - 7 | S | | | | X | | X | | 1 | All samples in brass or stainless steel 2"x6" or 2 1/2"x6" liners |
| 58 | { | 1419 | B-14 - 8 | S | | | | X | | | | 1 | |
| 59 | { | 1430 | B-14 - 9 | S | | | | X | | | | 1 | |
| 60 | { | 1515 | B-13 - 1 | S | | | | X | X | X | | 1 | |
| 61 | { | 1525 | B-13 - 2 | S | | | | X | X | | | 1 | |
| 62 | { | 1532 | B-13 - 3 | S | | | | X | | | | 1 | |
| 63 | { | 1548 | B-13 - 4 | S | | | | X | X | | | 1 | |
| 64 | { | 1558 | B-13 - 5 | S | | | | X | X | | | 1 | |
| 65 | { | 1607 | B-13 - 6 | S | | | | X | X | | | 1 | |
| 66 | { | 1612 | B-13 - 7 | S | | | | X | | | | 1 | |
| 67 | { | 1618 | B-13 - 8 | S | | | | X | | | | 1 | |
| 68 | ✓ | 1628 | B-13 - 9 | S | | | | X | | | | 1 | HOLD samples pending analysis request. 3 week TAT Contact Mike McGuire (510) 874-3288 |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | TOTAL NUMBER OF CONTAINERS | 12 | | | |
| RELINQUISHED BY: (Signature) <i>Bill [Signature]</i> | | DATE/TIME 5/11/93 | RECEIVED BY: (Signature) <i>[Signature]</i> | | RELINQUISHED BY: (Signature) | | DATE/TIME | RECEIVED BY: (Signature) | | | | | |
| METHOD OF SHIPMENT: Fed Ex AIRBILL# 6358918403/6358918392 | | | SHIPPED BY: (Signature) FOX: FED EX | | COURIER: (Signature) | | RECEIVED FOR LAB BY: (Signature) CHT | | DATE/TIME 5/12-93 2:50pm | | | | |

QUALITY CONTROL DATA

CLIENT: Woodward-Clyde
PROJECT: Carter Park #93C0243A
CONTROL NO: 93E048

METHOD: EPA 9045
DATE ANALYZED: 05/14/93
MATRIX: Soil

SAMPLE ID: 93E048-12

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
|----------|---------------------------------|--------------------------------------|----------|

| | | | |
|----|------|------|---|
| pH | 6.99 | 7.09 | 1 |
|----|------|------|---|

METHOD: EPA 9045
DATE ANALYZED: 05/14/93
MATRIX: Soil

SAMPLE ID: 93E048-29

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
|----------|---------------------------------|--------------------------------------|----------|

| | | | |
|----|------|------|---|
| pH | 6.39 | 6.51 | 2 |
|----|------|------|---|

METHOD: EPA 9045
DATE ANALYZED: 05/14/93
MATRIX: Soil

SAMPLE ID: 93E048-60

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
|----------|---------------------------------|--------------------------------------|----------|

| | | | |
|----|------|------|---|
| pH | 7.66 | 7.78 | 2 |
|----|------|------|---|

93E048

DUE 5- -93

CKT Lab

1 of 3 G.

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-
(415) 893-3600

-4014

Chain of Custody Record

PROJECT NO.

93C0243A

SAMPLERS: (Signature)

Bill [Signature]

ANALYSES

Sample Matrix
(Soil, Water, Air)

EPA Method

EPA Method

EPA Method

EPA Method

HOLD pending

Analysis request

TITLE 22 METALS

PH 9040/9045

HOMOGENIZE

Number of Containers

REMARKS

(Sample
preservation,
handling
procedures, etc.)

| | | | | | | | | | | | | | | | | |
|---|---------|------|--------|---|--|--|--|--|---|--|--|--|--|--|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------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| 1 | 5/10/93 | 0940 | B-15-1 | S | | | | | X | | | | | | 1 | All samples in brass or stainless steel 2"x6" or 2 1/2"x6" liners HOLD Samples pending analysis request <u>3 week TAT</u> Contact Mike McGuire (510) 874-3288 < |
|---|---------|------|--------|---|--|--|--|--|---|--|--|--|--|--|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------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TOTAL
NUMBER OF
CONTAINERS

28

RELINQUISHED BY:
(Signature)

Bill [Signature]

DATE/TIME

5/1/93 18:45

RECEIVED BY:
(Signature)

[Signature]

RELINQUISHED BY:
(Signature)

[Signature]

DATE/TIME

[Signature]

RECEIVED BY:
(Signature)

[Signature]

METHOD OF SHIPMENT:

FED Express
AIRBILL #SHIPPED BY:
(Signature)

FED EX

COURIER:
(Signature)

[Signature]

RECEIVED FOR LAB BY:
(Signature)

[Signature]

DATE/TIME

5-12-93 [Signature]

6358918463/6358918342

QUALITY CONTROL DATA

CLIENT: Woodward-Clyde
PROJECT: Carter Park #93C0243A
CONTROL NO: 93E048

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-10

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
| pH | 7.49 | 7.35 | 2 |

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-22

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
| pH | 4.10 | 4.08 | 0 |

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-31

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
| pH | 7.03 | 6.97 | 1 |

QUALITY CONTROL DATA

CLIENT: Woodward-Clyde
PROJECT: Carter Park #93C0243A
CONTROL NO: 93E048

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-40

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
|----------|---------------------------------|--------------------------------------|----------|

| | | | |
|----|------|------|---|
| pH | 7.89 | 7.97 | 1 |
|----|------|------|---|

METHOD: EPA 9045
DATE ANALYZED: 05/17/93
MATRIX: Soil

SAMPLE ID: 93E048-51

| COMPOUND | SAMPLE RESULTS (pH/units) | DUP. SAMPLE RESULTS (pH/units) | RPD % |
|----------|---------------------------------|--------------------------------------|----------|
|----------|---------------------------------|--------------------------------------|----------|

| | | | |
|----|------|------|---|
| pH | 7.22 | 7.11 | 2 |
|----|------|------|---|

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                     DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-25-5                     DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-05                  MATRIX:         Soil
% MOISTURE:   NA                        DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|---------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic | 5 | 300 |
| Lead | 5 | 732 |
| Zinc | 5 | 436 |

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-25-6                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-06                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 17.1 |
| Lead | 5 | 7.77 |
| Zinc | 5 | 49.2 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-25-2                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-02                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 7.5 |
| Zinc | 5 | 44.8 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-25-3                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-03                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 5.88 |
| Zinc | 5 | 47.1 |

**Analyzed by GFAA

EPA 9045

pH

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 06/25/93 |
| PROJECT: | Carter Park/93C0243A-2000 | DATE EXTRACTED: | 06/28/93 |
| CONTROL NO: | 93F128 | DATE ANALYZED: | 06/28/93 |
| MATRIX: | Soil | | |

=====

| SAMPLE ID: | CONTROL NO: | RESULTS (pH Unit) | DETECTION LIMIT (pH Unit) |
|------------|-------------|----------------------|------------------------------|
| B-25-1 | 93F128-1 | 5.91 | 0.1 |
| B-25-2 | 93F128-2 | 6.85 | 0.1 |
| B-25-3 | 93F128-3 | 7.20 | 0.1 |
| B-25-5 | 93F128-5 | 4.48 | 0.1 |
| B-25-6 | 93F128-6 | 7.24 | 0.1 |
| B-25-7 | 93F128-7 | 7.70 | 0.1 |
| B-24-1 | 93F128-8 | 4.08 | 0.1 |
| B-24-2 | 93F128-9 | 5.27 | 0.1 |
| B-24-3 | 93F128-10 | 7.02 | 0.1 |
| B-24-4 | 93F128-11 | 7.12 | 0.1 |
| B-24-5 | 93F128-12 | 7.28 | 0.1 |
| B-23-1 | 93F128-13 | 6.26 | 0.1 |
| B-23-2 | 93F128-14 | 7.74 | 0.1 |
| B-23-3 | 93F128-15 | 7.17 | 0.1 |
| B-23-4 | 93F128-16 | 7.32 | 0.1 |
| B-22-1 | 93F128-17 | 6.93 | 0.1 |
| B-22-2 | 93F128-18 | 7.94 | 0.1 |
| B-22-3 | 93F128-19 | 7.86 | 0.1 |
| B-22-4 | 93F128-20 | 3.63 | 0.1 |
| B-21-2 | 93F128-23 | 7.29 | 0.1 |
| B-21-3 | 93F128-24 | 7.44 | 0.1 |
| B-21-4 | 93F128-25 | 7.12 | 0.1 |
| B-21-6 | 93F128-27 | 7.49 | 0.1 |
| B-26-1 | 93F128-28 | 6.59 | 0.1 |
| B-26-2 | 93F128-29 | 7.30 | 0.1 |
| B-26-3 | 93F128-30 | 7.73 | 0.1 |
| B-26-4 | 93F128-31 | 7.52 | 0.1 |

=====

EPA METHOD 3050/6010
METALS BY ICP

```

=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-25-1                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-01                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
  
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 8.0 |
| Zinc | 5 | 65.5 |

**Analyzed by GFAA



CKY incorporated Analytical Laboratories

Date: 07/01/93
93F128

Woodward Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 946075

Attn: Mr. Mike McGuire

Subject: Laboratory Report
Project: Carter Park/93C0243A-2000

Enclosed is the laboratory report for samples received on 06/25/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

| <u>Method</u> | <u>No. of Analysis</u> |
|------------------------|------------------------|
| EPA 9045 | 27 Soils |
| EPA 3050/6010 (Metals) | 27 Soils |

The results are summarized on thirty-six pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,

A handwritten signature in cursive script, appearing to read 'K. Y. Pang', written over a horizontal dashed line.

Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed after fifteen (15) days from the date of this report.

CASE NARRATIVE

CLIENT: WOODWARD-CLYDE CONSULTANTS
PROJECT: CARTER PARK
CKY BATCH: 93F128

Twenty seven (27) soil samples were received on 06/25/93 for analyses by EPA methods 9045 and metals in accordance with SW846, USEPA 3rd Edition, 1986. Results are reported on wet weight basis.

1. Metal analyses by Method 3050/6010/7000

Arsenic was analyzed by GFAA with the exception of sample 93F128-05, which was analyzed by ICP. All other elements were analyzed by ICP. Method blank, lab control samples, RPD of lab control sample, and calibrations were all within control limit. Two sets of matrix spike were analyzed. Matrix spike recovery of Lead in sample 93F128-23 was out of the QC limit of 75-125%. Since lab control sample and post digestive spike results were within control, matrix effect or inhomogeneous sample were suspected. No corrective action was taken.

Two sets of duplicates were analyzed. Arsenic and Lead in sample 93F128-01 and Arsenic in sample 93F128-23 were out of the project specific QC limit of 20%. The samples were re-analyzed and similar results were obtained. Since the method blank and RPD of lab control samples were within control, the cause of discrepancy may be due to something other than the analytical process.

2. EPA Method 9045

Calibration and duplicates were all within control.

500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. 9310243A

Cutter Park

IPERS: (Signature)

[Signature]

| DATE | TIME | SAMPLE NUMBER | Sample Matrix (Soil, Water, Air) | EPA Method 8080 (PEST) | EPA Method 8140 | EPA Method 8150 | EPA Method 9040 (5, 6) | HAD pending analysis request | BEH 80/40/50 | He 22 METALS | HOMOGENIZED | Number of Containers | (Sample preservation, handling procedures, etc.) |
|---------|------|---------------|-------------------------------------|------------------------|-----------------|-----------------|------------------------|------------------------------|--------------|--------------|-------------|----------------------|--------------------------------------------------------------------------------------------------|
| 7/14/93 | 0830 | B-7-1 | S | X | X | X | X | X | X | X | X | 1 | All samples in brass or stainless steel liners. HOLD all samples pending analysis request |
| | 0839 | B-7-2 | S | X | X | X | X | X | X | X | X | 1 | |
| | 0854 | B-7-3 | S | | | X | X | X | | | | 1 | |
| | 0859 | B-7-4 | S | | | X | X | X | | | | 1 | |
| | 0904 | B-7-5 | S | | | X | X | X | | | | 1 | |
| | 0910 | B-7-6 | S | | | X | X | X | | | | 1 | |
| | 0922 | B-7-7 | S | | | X | X | X | | | | 1 | |
| | 0925 | B-7 GRB | S | | | X | X | X | | | | 1 | |
| | 1108 | B-6 GRB | S | | | X | X | X | | | | 1 | |
| | 1115 | B-6-1 | S | X | X | X | X | X | X | X | X | 1 | 3 week TAT |
| | 1123 | B-6-2 | S | | | X | X | X | X | X | X | 1 | |
| | 1133 | B-6-3 | S | | | X | X | X | | | | 1 | |
| | 1138 | B-6-4 | S | | | X | X | X | | | | 1 | |
| | 1143 | B-6-5 | S | | | X | X | X | | | | 1 | |
| | 1148 | B-6-6 | S | | | X | X | X | | | | 1 | |
| | 1156 | B-6-7 | S | | | X | X | X | | | | 1 | |
| | 1324 | B-3-1 | S | X | X | X | X | X | X | X | X | 1 | |
| | 1328 | B-3-2 | S | X | X | X | X | X | X | X | X | 1 | |
| | 1330 | B-3-3 | S | | | X | X | X | X | X | X | 1 | |
| | 1342 | B-3-4 | S | | | X | X | X | | | | 1 | |
| | 1346 | B-3-5 | S | | | X | X | X | | | | 1 | |
| | 1350 | B-3-6 | S | | | X | X | X | | | | 1 | |
| | 1356 | B-3-7 | S | | | X | X | X | | | | 1 | |
| | 1407 | B-3-8 | S | | | X | X | X | | | | 1 | |
| | 1420 | VCP EQ B | W | X | X | X | X | X | | | | 6 | |
| | 1420 | VCP EQ B | W | | | X | X | X | | | | 2 | Amber Glass liters 500ml plastic |

| | | | | | |
|------------------------------------------------------|----------------------------|-----------------------------|-----------------------------------------------------------|----------------------|---------------------------------------------------|
| ACQUISITION BY: (Signature) <i>[Signature]</i> | DATE/TIME 7/14/93 1625 | RECEIVED BY: (Signature) | RELINQUISHED BY: (Signature) | DATE/TIME 7/15/93 | RECEIVED BY: (Signature) <i>[Signature]</i> |
| SHIPMENT: Express | SHIPPED BY: (Signature) | COURIER: (Signature) | RECEIVED FOR LAB BY: (Signature) <i>[Signature]</i> | DATE/TIME 7/15/93 | |

PEDEX AIRBILL # 6574051304

G3

ANALYSIS REQUEST FORM

DUE 6-17-93

CLIENT NAME:

WCC/ Carter Park

CKY CONTROL NO.:

93E064

REQUESTED BY:

Y. Y. Juile

DATE:

6/10/93

LOGGED BY:

Cecilia Chavez

CKY CONTROL NO.

CLIENT SAMPLE ID

COMMENTS

93E064-2 ✓B-7-296 Zn (ICP) Arsenic (GFAA)E064-3 ✓B-7-3E064-4 ✓B-7-4E064-5 ✓B-7-5E064-20 ✓B-3-4 -E064-21 ✓B-3-5 ✓E064-22 ✓B-3-6 ✓E064-19 ✓B-3-3 ✓E064-8 ✓B-7-GRBE064-9 ✓B-6-GRB

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED:  05/18/93
SAMPLE ID:   B-3-2                     DATE ANALYZED:   05/26/93
CONTROL NO:  93E064-18                 MATRIX:         Soil
=====
```

| <u>PARAMETERS (8140)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|------------------------|--------------------------------|
| Dichlorovos | ND | 50 |
| Phosdrin | ND | 50 |
| Ethoprop | ND | 50 |
| Naled | ND | 100 |
| Phorate | ND | 50 |
| Demeton | ND | 100 |
| Diazinon | ND | 50 |
| Disulfoton | ND | 50 |
| Methyl parathion | ND | 50 |
| Ronnel | ND | 50 |
| Chlorpyrifos | ND | 50 |
| Fenthion | ND | 50 |
| Merphos | ND | 50 |
| Stirophos | ND | 100 |
| Tokuthion | ND | 100 |
| Fensulfothion | ND | 100 |
| Suprofos | ND | 50 |
| Azinphos Methyl | ND | 500 |
| Coumaphos | ND | 100 |
| | | |
| % Surrogate Rec. | | Accept. Range |
| Triphenol Phosphate | 65 | (20-140) |

=====

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED:  05/18/93
SAMPLE ID:   B-3-1                      DATE ANALYZED:   05/26/93
CONTROL NO:  93E064-17                  MATRIX:         Soil
=====
```

| <u>PARAMETERS (8140)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|----------------------------|------------------------------------|
| Dichlorovos | ND | 50 |
| Phosdrin | ND | 50 |
| Ethoprop | ND | 50 |
| Naled | ND | 100 |
| Phorate | ND | 50 |
| Demeton | ND | 100 |
| Diazinon | ND | 50 |
| Disulfoton | ND | 50 |
| Methyl parathion | ND | 50 |
| Ronnel | ND | 50 |
| Chlorpyrifos | ND | 50 |
| Fenthion | ND | 50 |
| Merphos | ND | 50 |
| Stirophos | ND | 100 |
| Tokuthion | ND | 100 |
| Fensulfothion | ND | 100 |
| Suprofos | ND | 50 |
| Azinphos Methyl | ND | 500 |
| Coumaphos | ND | 100 |

% Surrogate Rec. Accept. Range

Triphenol Phosphate 88 (20-140)

=====

EPA METHOD 8150
HERBICIDES

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/17/93 |
| SAMPLE ID: | VCPEQB | DATE ANALYZED: | 05/22/93 |
| CONTROL NO: | 93E064-25 | MATRIX: | Water |

=====

| <u>PARAMETERS (8150)</u> | <u>RESULTS (ug/L)</u> | <u>DETECTION LIMIT (ug/L)</u> |
|--------------------------|-----------------------|-------------------------------|
| 2,4-D | ND | 0.5 |
| 2,4-DB | ND | 0.5 |
| 2,4,5-T | ND | 0.1 |
| 2,4,5-TP (Silvex) | ND | 0.1 |
| Dicamba | ND | 0.5 |
| Dichloroprop | ND | 0.5 |
| Dinoseb | ND | 0.1 |
| Dalapon | ND | 1.0 |
| MCPA | ND | 200 |
| MCP | ND | 200 |
| % Surrogate Recovery | 115 | 20-140 |

=====

EPA METHOD 8140
ORGANOPHOSPHOROUS PESTICIDES

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:     Carter Park                 DATE EXTRACTED:  05/18/93
SAMPLE ID:   Method Blank                DATE ANALYZED:   05/26/93
CONTROL NO:  93E064-Blk                 MATRIX:         Soil
=====
```

| <u>PARAMETERS (8140)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|------------------------|--------------------------------|
| Dichlorovos | ND | 50 |
| Phosdrin | ND | 50 |
| Ethoprop | ND | 50 |
| Naled | ND | 100 |
| Phorate | ND | 50 |
| Demeton | ND | 100 |
| Diazinon | ND | 50 |
| Disulfoton | ND | 50 |
| Methyl parathion | ND | 50 |
| Ronnel | ND | 50 |
| Chlorpyrifos | ND | 50 |
| Fenthion | ND | 50 |
| Merphos | ND | 50 |
| Stirophos | ND | 100 |
| Tokuthion | ND | 100 |
| Fensulfothion | ND | 100 |
| Suprofos | ND | 50 |
| Azinphos Methyl | ND | 500 |
| Coumaphos | ND | 100 |
| | | |
| % Surrogate Rec. | | Accept. Range |
| Triphenol Phosphate | 106 | (20-140) |

=====

EPA METHOD 8150
HERBICIDES

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/19/93 |
| SAMPLE ID: | B-7-1 | DATE ANALYZED: | 05/22/93 |
| CONTROL NO: | 93E064-1 | MATRIX: | Soil |

=====

| <u>PARAMETERS</u> <u>(8150)</u> | <u>RESULTS</u> <u>(ug/kg)</u> | <u>DETECTION LIMIT</u> <u>(ug/kg)</u> |
|---------------------------------|----------------------------------|------------------------------------------|
| 2,4-D | ND | 5 |
| 2,4-DB | ND | 5 |
| 2,4,5-T | ND | 2 |
| 2,4,5-TP (Silvex) | ND | 2 |
| Dicamba | ND | 5 |
| Dichloroprop | ND | 5 |
| Dinoseb | ND | 2 |
| Dalapon | ND | 10 |
| MCPA | ND | 4000 |
| MCP | ND | 4000 |
| % Surrogate Recovery | 122 | 20-140 |

=====

EPA METHOD 8150
HERBICIDES

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/17/93 |
| SAMPLE ID: | Method Blank | DATE ANALYZED: | 05/22/93 |
| CONTROL NO: | 93E064 | MATRIX: | Water |

=====

| <u>PARAMETERS</u> <u>(8150)</u> | <u>RESULTS</u> <u>(ug/L)</u> | <u>DETECTION LIMIT</u> <u>(ug/L)</u> |
|---------------------------------|---------------------------------|-----------------------------------------|
| 2,4-D | ND | 0.5 |
| 2,4-DB | ND | 0.5 |
| 2,4,5-T | ND | 0.1 |
| 2,4,5-TP (Silvex) | ND | 0.1 |
| Dicamba | ND | 0.5 |
| Dichloroprop | ND | 0.5 |
| Dinoseb | ND | 0.1 |
| Dalapon | ND | 1.0 |
| MCPA | ND | 200 |
| MCPP | ND | 200 |
| % Surrogate Recovery | 111 | 20-140 |

=====

EPA METHOD 8150
HERBICIDES

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/19/93 |
| SAMPLE ID: | B-3-1 | DATE ANALYZED: | 05/22/93 |
| CONTROL NO: | 93E064-17 | MATRIX: | Soil |

=====

| <u>PARAMETERS (8150)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|------------------------|--------------------------------|
| 2,4-D | ND | 5 |
| 2,4-DB | ND | 5 |
| 2,4,5-T | ND | 2 |
| 2,4,5-TP (Silvex) | ND | 2 |
| Dicamba | ND | 5 |
| Dichloroprop | ND | 5 |
| Dinoseb | ND | 2 |
| Dalapon | ND | 10 |
| MCPA | ND | 4000 |
| MCPP | ND | 4000 |
| % Surrogate Recovery | 132 | 20-140 |

=====

EPA METHOD 8150
HERBICIDES

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/19/93 |
| SAMPLE ID: | B-6-1 | DATE ANALYZED: | 05/22/93 |
| CONTROL NO: | 93E064-10 | MATRIX: | Soil |

=====

| <u>PARAMETERS</u> <u>(8150)</u> | <u>RESULTS</u> <u>(ug/kg)</u> | <u>DETECTION LIMIT</u> <u>(ug/kg)</u> |
|---------------------------------|----------------------------------|------------------------------------------|
| 2,4-D | ND | 5 |
| 2,4-DB | ND | 5 |
| 2,4,5-T | ND | 2 |
| 2,4,5-TP (Silvex) | ND | 2 |
| Dicamba | ND | 5 |
| Dichloroprop | ND | 5 |
| Dinoseb | ND | 2 |
| Dalapon | ND | 10 |
| MCPA | ND | 4000 |
| MCP | ND | 4000 |
| % Surrogate Recovery | 132 | 20-140 |

=====

EPA METHOD 8150
HERBICIDES

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/19/93 |
| SAMPLE ID: | Method Blank | DATE ANALYZED: | 05/22/93 |
| CONTROL NO: | 93E064 | MATRIX: | Soil |

=====

| <u>PARAMETERS</u> <u>(8150)</u> | <u>RESULTS</u> <u>(ug/kg)</u> | <u>DETECTION LIMIT</u> <u>(ug/kg)</u> |
|---------------------------------|----------------------------------|------------------------------------------|
| 2,4-D | ND | 5 |
| 2,4-DB | ND | 5 |
| 2,4,5-T | ND | 2 |
| 2,4,5-TP (Silvex) | ND | 2 |
| Dicamba | ND | 5 |
| Dichloroprop | ND | 5 |
| Dinoseb | ND | 2 |
| Dalapon | ND | • 10 |
| MCPA | ND | 4000 |
| MCPP | ND | 4000 |
| % Surrogate Recovery | 60 | 20-140 |

=====

EPA METHOD 8150
HERBICIDES

=====

| | | | |
|-------------|----------------------------|-----------------|----------|
| CLIENT: | Woodward Clyde Consultants | DATE REC'D: | 05/15/93 |
| PROJECT: | Carter Park | DATE EXTRACTED: | 05/19/93 |
| SAMPLE ID: | B-3-2 | DATE ANALYZED: | 05/22/93 |
| CONTROL NO: | 93E064-18 | MATRIX: | Soil |

=====

| <u>PARAMETERS (8150)</u> | <u>RESULTS (ug/kg)</u> | <u>DETECTION LIMIT (ug/kg)</u> |
|--------------------------|------------------------|--------------------------------|
| 2,4-D | ND | 5 |
| 2,4-DB | ND | 5 |
| 2,4,5-T | ND | 2 |
| 2,4,5-TP (Silvex) | ND | 2 |
| Dicamba | ND | 5 |
| Dichloroprop | ND | 5 |
| Dinoseb | ND | 2 |
| Dalapon | ND | • 10 |
| MCPA | ND | 4000 |
| MCP | ND | 4000 |
| % Surrogate Recovery | 128 | 20-140 |

=====

EPA METHOD 3050/6010
CAM METALS BY ICP

```

=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                      DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-6-1                       DATE ANALYZED:  05/19/93
CONTROL NO.: 93E064-10                   MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====

```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | 206 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 63.7 |
| Cobalt | 2.5 | 6.77 |
| Copper | 1 | 49 |
| Lead | 5 | 12.4 |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 49.2 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 75.1 |
| Zinc | 5 | 62.7 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                       DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-7-1                        DATE ANALYZED:  05/19/93
CONTROL NO.: 93E064-01                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | 11.6 |
| Barium | 2.5 | 100 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 77.3 |
| Cobalt | 2.5 | 10.6 |
| Copper | 1 | 70.1 |
| Lead | 5 | 9.87 |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 61.2 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 72.1 |
| Zinc | 5 | 76.5 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                     DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-3-2                      DATE ANALYZED:  05/19/93
CONTROL NO.: 93E064-18                  MATRIX:         Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | 8.1 |
| Barium | 2.5 | 244 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 60.5 |
| Cobalt | 2.5 | 9.2 |
| Copper | 1 | 38.5 |
| Lead | 5 | 10.9 |
| Mercury* | .05 | 0.06 |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 44.5 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 66.7 |
| Zinc | 5 | 326 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/14/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/15/93
BATCH NO.:   93E064                       DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-3-1                        DATE ANALYZED:  05/19/93
CONTROL NO.: 93E064-17                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | 18.8 |
| Barium | 2.5 | 224 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 59.1 |
| Cobalt | 2.5 | 4.78 |
| Copper | 1 | 78.3 |
| Lead | 5 | 13.2 |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 30.6 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 67.2 |
| Zinc | 5 | 299 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA 9045

pH

```
=====
CLIENT:      Woodward Clyde Consultants  DATE REC'D:      05/15/93
PROJECT:      Carter Park                 DATE EXTRACTED:   05/24/91
CONTROL NO:   93E064                     DATE ANALYZED:    05/24/93
MATRIX:       Soil
=====
```

| SAMPLE ID: | CONTROL NO: | RESULTS (pH Unit) | DETECTION LIMIT (pH Unit) |
|------------|-------------|----------------------|------------------------------|
| B-7-1 | 93E064-1* | 6.85 | 0.10 |
| B-7-2 | 93E064-2* | 7.00 | 0.10 |
| B-7-3 | 93E064-3 | 7.69 | 0.10 |
| B-7-4 | 93E064-4 | 7.71 | 0.10 |
| B-7-5 | 93E064-5 | 7.51 | 0.10 |
| B-7-6 | 93E064-6 | 7.50 | 0.10 |
| B-7GRB | 93E064-8 | 6.34 | 0.10 |
| B-6GRB | 93E064-9 | 6.44 | 0.10 |
| B-6-1 | 93E064-10* | 6.95 | 0.10 |
| B-6-2 | 93E064-11* | 7.59 | 0.10 |
| B-6-3 | 93E064-12 | 7.90 | 0.10 |
| B-6-4 | 93E064-13 | 7.87 | 0.10 |
| B-6-5 | 93E064-14 | 7.54 | 0.10 |
| B-6-6 | 93E064-15 | 7.80 | 0.10 |
| B-3-1 | 93E064-17* | 3.87 | 0.10 |
| B-3-2 | 93E064-18* | 5.58 | 0.10 |
| B-3-3 | 93E064-19* | 7.08 | 0.10 |
| B-3-4 | 93E064-20 | 7.59 | 0.10 |
| B-3-5 | 93E064-21 | 7.66 | 0.10 |
| B-3-6 | 93E064-22 | 7.72 | 0.10 |
| B-3-7 | 93E064-23 | 7.78 | 0.10 |

* Date Analyzed: 05/18/93

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:   NA
BATCH NO.:   93E064                        DATE EXTRACTED:  05/18/93
SAMPLE ID:   METHOD BLANK                   DATE ANALYZED:   05/19/93
CONTROL NO.: 93E064-BLK                     MATRIX:         Soil
% MOISTURE:  NA                             DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | ND |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | ND |
| Cobalt | 2.5 | ND |
| Copper | 1 | ND |
| Lead | 5 | ND |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | ND |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | ND |
| Zinc | 5 | ND |

* EPA METHOD 7471
**Analyzed by GFAA

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064 DATE RECEIVED: 05/15/93
SAMPLE ID: B-7-1 DATE EXTRACTED: 05/18/93
CONTROL NO.: 93E064-01 DATE ANALYZED: 05/19/93

ACCESSION: 93E057 93E064

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECR (%) |
|------------|--------------------------|------------------------|-------------------------|-------------------|
| Antimony | ND | 100 | 38.7 | 39+ |
| Arsenic** | 11.6 | 100 | 150 | 138+ |
| Barium | 100 | 100 | 390 | 290+ |
| Beryllium | ND | 100 | 94 | 94 |
| Cadmium | ND | 100 | 93.2 | 93 |
| Chromium | 77.3 | 100 | 155 | 78 |
| Cobalt | 10.6 | 100 | 95.9 | 85 |
| Copper | 70.1 | 100 | 164 | 94 |
| Lead | 9.87 | 100 | 102 | 92 |
| Mercury* | ND | 0.87 | 0.95 | 109 |
| Molybdenum | ND | 100 | 82.4 | 82 |
| Nickel | 61.2 | 100 | 153 | 91 |
| Selenium | ND | 100 | ND | 0+ |
| Silver | ND | 100 | 89.7 | 90 |
| Thallium | ND | 100 | 115 | 115 |
| Vanadium | 72.1 | 100 | 155 | 83 |
| Zinc | 76.5 | 100 | 163 | 87 |

* EPA METHOD 7471
**Analyzed by GFAA
+ Outliner

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064 DATE RECEIVED: NA
SAMPLE ID: METHOD BLANK DATE EXTRACTED: 05/18/93
CONTROL NO.: 93E048-BLK DATE ANALYZED: 05/19/93

ACCESSION: 93E048 93E057 93E064

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY (%) |
|------------|--------------------------|------------------------|-------------------------|--------------------|
| Antimony | ND | 100 | 96.8 | 97 |
| Arsenic** | ND | 100 | 107 | 107 |
| Barium | ND | 100 | 97.9 | 98 |
| Beryllium | ND | 100 | 96.3 | 96 |
| Cadmium | ND | 100 | 97.1 | 97 |
| Chromium | ND | 100 | 100 | 100 |
| Cobalt | ND | 100 | 99.5 | 99 |
| Copper | ND | 100 | 99.2 | 99 |
| Lead | ND | 100 | 97.9 | 98 |
| Molybdenum | ND | 100 | 98.8 | 99 |
| Nickel | ND | 100 | 99.3 | 99 |
| Selenium | ND | 100 | 104 | 104 |
| Silver | ND | 100 | 89.9 | 90 |
| Thallium | ND | 100 | 94.8 | 95 |
| Vanadium | ND | 100 | 99.7 | 100 |
| Zinc | ND | 100 | 96.9 | 97 |

**Analyzed by GFAA

CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

LIENT: Woodward-Clyde Consultants
ROJECT: Carter Park - 93C0243A
ETHOD: EPA 3050/6010
ATRIX: Soil

ATCH NO.: 93E064 DATE RECEIVED: NA
AMPLE ID: ERA 215 DATE EXTRACTED: 05/18/93
ONTROL NO.: 93E048-LCS DATE ANALYZED: 05/19/93

CCESSION: 93E048 93E057 93E064

| arameter | FOUND VALUE (mg/kg) | TRUE VALUE (mg/kg) | ACCEPTANCE RANGE (mg/kg) |
|-----------|------------------------|-----------------------|-----------------------------|
| ntimony | 30.2 | 21.3 | 9.0 - 130 |
| rsenic** | 29.3 | 34.2 | 13 - 51 |
| arium | 106 | 97.4 | 68 - 127 |
| eryllium | 58.6 | 58.1 | 35 - 87 |
| admium | 78 | 70.3 | 35 - 112 |
| hromium | 202 | 182 | 82 - 255 |
| obalt | 124 | 120 | 66 - 180 |
| opper | 97.1 | 92.7 | 46 - 139 |
| ead | 44.6 | 44.5 | 20 - 65 |
| ercury* | 11.6 | 13.7 | 7.5 - 21 |
| olybdenum | 53.3 | 45 | 25 - 74 |
| ickel | 141 | 137 | 68 - 212 |
| elenium | 30 | 33.1 | 17 - 53 |
| ilver | 72.1 | 64.4 | 26 - 113 |
| hallium | 118 | 140 | 70 - 210 |
| anadium | 44.7 | 40.1 | 28 - 54 |
| inc | 89.9 | 78.2 | 39 - 121 |

EPA METHOD 7471
*Analyzed by GFAA

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E064 DATE RECEIVED: 05/15/93
SAMPLE ID: B-7-1 DATE EXTRACTED: 05/18/93
CONTROL NO.: 93E064-01 DATE ANALYZED: 05/19/93

ACCESSION: 93E057 93E064

| Parameter | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|------------|-----------------------------|---------------------------------|----------------------|
| Antimony | ND | ND | 0 |
| Arsenic** | 11.6 | 9.36 | 21+ |
| Barium | 100 | 187 | 61+ |
| Beryllium | ND | ND | 0 |
| Cadmium | ND | ND | 0 |
| Chromium | 77.3 | 60.1 | 25+ |
| Cobalt | 10.6 | 12.7 | 18 |
| Copper | 70.1 | 70.9 | 1 |
| Lead | 9.87 | 10.1 | 3 |
| Mercury* | ND | ND | 0 |
| Molybdenum | ND | ND | 0 |
| Nickel | 61.2 | 73.9 | 19 |
| Selenium | ND | ND | 0 |
| Silver | ND | ND | 0 |
| Thallium | ND | ND | 0 |
| Vanadium | 72.1 | 51.4 | 34+ |
| Zinc | 76.5 | 76 | 1 |

* EPA METHOD 7471
**Analyzed by GFAA
+ Outliner

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park
CONTROL NO: 93E064

METHOD EPA 8080
MATRIX: Soil
DATE ANALYZED: 05/24/93
SAMPLE ID: 93E064-1

| PARAMETER | SAMPLE RESULTS (ug/kg) | AMOUNT SPIKED (ug/kg) | % REC. | DUP. % REC. | ACCEPT. CRITERIA | RPD | % RPD LIMITS |
|------------|---------------------------|--------------------------|--------|----------------|---------------------|-----|-----------------|
| gamma-BHC | ND | 16.67 | 100 | 81 | 46-127 | 21 | 50 |
| Heptachlor | ND | 16.67 | 125 | 97 | 35-130 | 25 | 31 |
| Aldrin | ND | 16.67 | 119 | 105 | 34-132 | 12 | 43 |
| Dieldrin | ND | 33.33 | 112 | 95 | 31-134 | 16 | 38 |
| Endrin | ND | 33.33 | 117 | 98 | 42-139 | 18 | 45 |
| DDT | ND | 33.33 | 120 | 102 | 23-134 | 16 | 50 |

METHOD EPA 8080
MATRIX: Soil
DATE ANALYZED: 05/24/93
SAMPLE ID: Method Blank

| PARAMETER | AMOUNT SPIKED (ug/kg) | % REC. | ACCEPT. CRITERIA |
|------------|--------------------------|--------|---------------------|
| gamma-BHC | 16.67 | 93 | 50-150 |
| Heptachlor | 16.67 | 102 | 50-150 |
| Aldrin | 16.67 | 120 | 50-150 |
| Dieldrin | 33.33 | 119 | 50-150 |
| Endrin | 33.33 | 124 | 50-150 |
| DDT | 33.33 | 128 | 50-150 |

METHOD EPA 608
MATRIX: Water
DATE ANALYZED: 05/24/93
SAMPLE ID: Method Blank

| PARAMETER | SAMPLE RESULTS (ug/L) | AMOUNT SPIKED (ug/L) | % REC. | DUP. % REC. | ACCEPT. CRITERIA | RPD | %RPD LIMITS |
|------------|--------------------------|-------------------------|--------|----------------|---------------------|-----|----------------|
| gamma-BHC | ND | 50 | 77 | 94 | 56-123 | 19 | 15 |
| Heptachlor | ND | 50 | 93 | 112 | 40-131 | 18 | 20 |
| Aldrin | ND | 50 | 92 | 112 | 40-120 | 19 | 22 |
| Dieldrin | ND | 100 | 108 | 114 | 52-126 | 5 | 18 |
| Endrin | ND | 100 | 112 | 113 | 56-121 | 1 | 21 |
| DDT | ND | 100 | 118 | 115 | 38-127 | 3 | 27 |

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
 PROJECT: Carter Park
 CONTROL NO: 93E064

METHOD: EPA 9045
 DATE ANALYZED: 05/24/93
 MATRIX: Soil

SAMPLE ID: 93E064-9

| <u>PARAMETER</u> | <u>SAMPLE RESULT</u> (pH unit) | DUP. <u>SAMPLE RESULT</u> (pH unit) | <u>%RPD</u> |
|------------------|---------------------------------------|-----------------------------------------------|-------------|
| pH | 6.44 | 6.59 | 2 |

METHOD: EPA 9045
 DATE ANALYZED: 05/24/93
 MATRIX: Soil

SAMPLE ID: 93E064-23

| <u>PARAMETER</u> | <u>SAMPLE RESULT</u> (pH unit) | DUP. <u>SAMPLE RESULT</u> (pH unit) | <u>%RPD</u> |
|------------------|---------------------------------------|-----------------------------------------------|-------------|
| pH | 7.78 | 7.82 | 1 |

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park
CONTROL NO: 93E064

METHOD EPA 8150
MATRIX: Soil
DATE ANALYZED: 05/15/93
SAMPLE ID: Method Blank

| PARAMETER | AMOUNT SPIKED (ug/kg) | % REC. | ACCEPT. CRITERIA |
|-----------|-----------------------------|--------|---------------------|
| 2,4-D | 250 | 75 | 20-140 |
| Silvex | 100 | 93 | 20-140 |

METHOD EPA 8150
MATRIX: Water
DATE ANALYZED: 05/22/93
SAMPLE ID: Method Blank

| PARAMETER | SAMPLE RESULTS (ug/L) | AMOUNT SPIKED (ug/L) | % REC. | ACCEPT. CRITERIA |
|-----------|-----------------------------|----------------------------|--------|---------------------|
| 2,4-D | ND | 250 | 86 | 10-140 |
| Silvex | ND | 100 | 92 | 10-140 |

METHOD EPA 8150
MATRIX: Soil
DATE ANALYZED: 05/24/93
SAMPLE ID: 93E064-1

| PARAMETER | SAMPLE RESULTS (ug/kg) | AMOUNT SPIKED (ug/kg) | % REC. | DUP. % REC. | ACCEPT. CRITERIA | RPD | %RPD LIMITS |
|-----------|------------------------------|-----------------------------|--------|----------------|---------------------|-----|----------------|
| 2,4-D | ND | 250 | 69 | 74 | 10-140 | 7 | 50 |
| Silvex | ND | 100 | 67 | 60 | 10-140 | 10 | 50 |

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
 PROJECT: Carter Park
 CONTROL NO: 93E064

METHOD EPA 8140
 DATE ANALYZED: 05/26/93
 MATRIX: Soil

SAMPLE ID: Method Blank

| PARAMETER | AMOUNT SPIKED (ug/kg) | % REC. | ACCEPT. CRITERIA |
|------------|-----------------------------|--------|---------------------|
| Phorate | .67 | 109 | 40-140 |
| Disulfoton | .67 | 100 | 40-140 |

METHOD EPA 8140
 DATE ANALYZED: 05/26/93
 MATRIX: Water

SAMPLE ID: Method Blank

| PARAMETER | SAMPLE RESULTS (ug/L) | AMOUNT SPIKED (ug/L) | % REC. | DUP. % REC. | ACCEPT. CRITERIA | RPD | %RPD LIMITS |
|------------|-----------------------------|----------------------------|--------|----------------|---------------------|-----|----------------|
| Phorate | ND | 0.02 | 118 | 110 | 30-140 | 7 | 50 |
| Disulfoton | ND | 0.02 | 104 | 101 | 30-140 | 3 | 50 |

METHOD EPA 8140
 DATE ANALYZED: 05/26/93
 MATRIX: Soil

SAMPLE ID: 93E064-1

| PARAMETER | SAMPLE RESULTS (ug/kg) | AMOUNT SPIKED (ug/kg) | % REC. | DUP. % REC. | ACCEPT. CRITERIA | RPD | %RPD LIMITS |
|------------|------------------------------|-----------------------------|--------|----------------|---------------------|-----|----------------|
| Phorate* | ND | 0.67 | 0 | 0 | 30-140 | 0 | 50 |
| Disulfoton | ND | 0.67 | 37 | 38 | 30-140 | 3 | 50 |

% Surrogate Rec. 105 89 16

* Phorate was not recovered from the sample spike or spike duplicate. However, the surrogate recoveries were 105 and 89% respectively and LCS met the QC requirements. No corrective action was taken, matrix effect was suspected.



CKY incorporated
Analytical Laboratories

Date: 05/26/93
93E048

Woodward-Clyde Consultants
500-12th Street, Suite 100
Oakland, CA 94607

Attn: Mr. Michael McGuire

Subject: Laboratory Report
Project: Carter Park #93C0243A

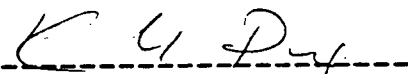
Enclosed is the laboratory report for samples received on 05/12/93. The samples were received in coolers with ice and intact; the chain-of-custody forms were properly filled out. The data reported includes:

| <u>Method</u> | <u>No. of Analysis</u> |
|---------------|------------------------|
| EPA 9045 | 50 Soils |
| EPA 3050/6010 | 9 Soils |

The results are summarized on eighteen pages.

Please feel free to call if you have any questions concerning these results.

Sincerely,



Kam Y. Pang, Ph.D.
Laboratory Director

P.S. - All analyses requested for the above referenced project have been completed. Therefore, unless instructed, the remaining portions of the samples will be disposed of after fifteen (15) days from the date of this report.

EPA 9045

pH

| | | | |
|-------------|-----------------------|-----------------|----------|
| CLIENT: | Woodward-Clyde | DATE REC'D: | 05/12/93 |
| PROJECT: | Carter Park #93C0243A | DATE EXTRACTED: | 05/17/93 |
| CONTROL NO: | 93E048 | DATE ANALYZED: | 05/17/93 |
| MATRIX: | Soil | | |

| SAMPLE ID: | CONTROL NO: | RESULTS (pH Unit) | DETECTION LIMIT (pH Unit) |
|------------|-------------|----------------------|------------------------------|
| B-15-2 | 93E048-02 | 7.10 | 0.10 |
| B-15-3 | 93E048-03 | 6.35 | 0.10 |
| B-15-4 | 93E048-04* | 7.43 | 0.10 |
| B-15-5 | 93E048-05 | 7.58 | 0.10 |
| B-15-6 | 93E048-06 | 7.75 | 0.10 |
| B-15-7 | 93E048-07 | 7.49 | 0.10 |
| B-15-8 | 93E048-08 | 7.37 | 0.10 |
| B-15-9 | 93E048-09 | 7.26 | 0.10 |
| B-16-1 | 93E048-10 | 9.49 | 0.10 |
| B-16-2 | 93E048-11* | 7.14 | 0.10 |
| B-16-3 | 93E048-12* | 6.99 | 0.10 |
| B-16-4 | 93E048-13 | 6.81 | 0.10 |
| B-16-6 | 93E048-15 | 8.08 | 0.10 |
| B-16-7 | 93E048-16 | 7.59 | 0.10 |
| B-16-8 | 93E048-17 | 7.47 | 0.10 |
| B-19-1 | 93E048-19 | 7.67 | 0.10 |
| B-19-2 | 93E048-20* | 3.65 | 0.10 |
| B-19-4 | 93E048-22 | 4.10 | 0.10 |
| B-19-6 | 93E048-24 | 7.10 | 0.10 |
| B-19-7 | 93E048-25 | 7.56 | 0.10 |
| B-18-1 | 93E048-28 | 8.08 | 0.10 |
| B-18-2 | 93E048-29* | 6.39 | 0.10 |
| B-18-4 | 93E048-31 | 7.03 | 0.10 |
| B-18-5 | 93E048-32 | 7.57 | 0.10 |
| B-18-6 | 93E048-33 | 7.43 | 0.10 |
| B-18-7 | 93E048-34 | 7.56 | 0.10 |
| B-17-1 | 93E048-36 | 7.87 | 0.10 |
| B-17-2 | 93E048-37* | 6.73 | 0.10 |
| B-17-4 | 93E048-39 | 7.76 | 0.10 |
| B-17-5 | 93E048-40 | 7.89 | 0.10 |
| B-17-6 | 93E048-41 | 7.94 | 0.10 |
| B-20-1 | 93E048-43 | 7.61 | 0.10 |
| B-20-2 | 93E048-44* | 7.37 | 0.10 |

* Samples extracted & analyzed on 05/14/93

EPA 9045

pH

| | | | |
|-------------|-----------------------|-----------------|----------|
| CLIENT: | Woodward-Clyde | DATE REC'D: | 05/12/93 |
| PROJECT: | Carter Park #93C0243A | DATE EXTRACTED: | 05/17/93 |
| CONTROL NO: | 93E048 | DATE ANALYZED: | 05/17/93 |
| MATRIX: | Soil | | |

| SAMPLE ID: | CONTROL NO: | RESULTS (pH Unit) | DETECTION LIMIT (pH Unit) |
|------------|-------------|----------------------|------------------------------|
| B-20-3 | 93E048-45 | 7.48 | 0.10 |
| B-20-4 | 93E048-46 | 8.13 | 0.10 |
| B-20-5 | 93E048-47 | 8.10 | 0.10 |
| B-20-6 | 93E048-48 | 7.79 | 0.10 |
| B-20-7 | 93E048-49 | 7.92 | 0.10 |
| B-14-1 | 93E048-51 | 7.22 | 0.10 |
| B-14-2 | 93E048-52* | 7.90 | 0.10 |
| B-14-3 | 93E048-53 | 11.03 | 0.10 |
| B-14-4 | 93E048-54 | 7.39 | 0.10 |
| B-14-5 | 93E048-55 | 7.57 | 0.10 |
| B-14-6 | 93E048-56 | 7.67 | 0.10 |
| B-14-7 | 93E048-57 | 7.74 | 0.10 |
| B-13-1 | 93E048-60* | 7.66 | 0.10 |
| B-13-2 | 93E048-61 | 7.56 | 0.10 |
| B-13-4 | 93E048-63 | 7.93 | 0.10 |
| B-13-5 | 93E048-64 | 8.05 | 0.10 |
| B-13-6 | 93E048-65 | 8.04 | 0.10 |

* Samples extracted & analyzed on 05/14/93

EPA METHOD 3050/6010
CAM METALS BY ICP

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/10/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/12/93 |
| BATCH NO.: | 93E048 | DATE EXTRACTED: | 05/18/93 |
| SAMPLE ID: | B-15-4 | DATE ANALYZED: | 05/19/93 |
| CONTROL NO.: | 93E048-04 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | 156 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 64.3 |
| Cobalt | 2.5 | 12.4 |
| Copper | 1 | 81.4 |
| Lead | 5 | 9.61 |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 57 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 52.8 |
| Zinc | 5 | 75 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                     DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-16-2                     DATE ANALYZED:  05/19/93
CONTROL NO.: 93E048-11                  MATRIX:         Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | 240 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 63 |
| Cobalt | 2.5 | 10.2 |
| Copper | 1 | 40.7 |
| Lead | 5 | 8.87 |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | . ND |
| Nickel | 2.5 | 44.4 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 62.5 |
| Zinc | 5 | 52.4 |

* EPA METHOD 7471

**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-16-3                       DATE ANALYZED:  05/19/93
CONTROL NO.: 93E048-12                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | 148 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 52.4 |
| Cobalt | 2.5 | 8.91 |
| Copper | 1 | 38.7 |
| Lead | 5 | 6.97 |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 39.2 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 43.9 |
| Zinc | 5 | 49.7 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```

=====
CLIENT:      Woodward-Clyde Consultants      DATE COLLECTED: 05/10/93
PROJECT:     Carter Park - 93C0243A          DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                          DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-19-2                          DATE ANALYZED:  05/19/93
CONTROL NO.: 93E048-20                       MATRIX:         Soil
% MOISTURE:   NA                             DILUTION FACTOR: 1
=====

```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | 114 |
| Beryllium | .75 | ND |
| Cadmium | 1 | 1.8 |
| Chromium | 2.5 | 72.5 |
| Cobalt | 2.5 | 8.12 |
| Copper | 1 | 58.7 |
| Lead | 5 | 20.2 |
| Mercury* | .05 | 0.11 |
| Molybdenum | 2.5 | .ND |
| Nickel | 2.5 | 34.5 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 64 |
| Zinc | 5 | 72.4 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/10/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/12/93 |
| BATCH NO.: | 93E048 | DATE EXTRACTED: | 05/18/93 |
| SAMPLE ID: | B-18-2 | DATE ANALYZED: | 05/19/93 |
| CONTROL NO.: | 93E048-29 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | 184 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 90.5 |
| Cobalt | 2.5 | 9.2 |
| Copper | 1 | 54 |
| Lead | 5 | 7.47 |
| Mercury* | .05 | 0.15 |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 54.7 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 74.7 |
| Zinc | 5 | 68.4 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```

=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 05/11/93
PROJECT:     Carter Park - 93C0243A       DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-17-2                       DATE ANALYZED:  05/19/93
CONTROL NO.: 93E048-37                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====

```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | 250 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 73.9 |
| Cobalt | 2.5 | 13.2 |
| Copper | 1 | 46.4 |
| Lead | 5 | 10.4 |
| Mercury* | .05 | 0.21 |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 73.3 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 73.8 |
| Zinc | 5 | 67 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/11/93
PROJECT:      Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:    93E048                       DATE EXTRACTED: 05/18/93
SAMPLE ID:    B-20-2                       DATE ANALYZED:  05/19/93
CONTROL NO.:  93E048-44                    MATRIX:         Soil
% MOISTURE:    NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| Antimony | 15 | ND |
| Arsenic** | 5 | 5.14 |
| Barium | 2.5 | 137 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 59.7 |
| Cobalt | 2.5 | 6.22 |
| Copper | 1 | 66.1 |
| Lead | 5 | 13.6 |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 49.1 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 51.7 |
| Zinc | 5 | 73.2 |

* EPA METHOD 7471

**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 05/11/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  05/12/93
BATCH NO.:   93E048                       DATE EXTRACTED: 05/18/93
SAMPLE ID:   B-14-2                       DATE ANALYZED:  05/19/93
CONTROL NO.: 93E048-52                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | 5.89 |
| Barium | 2.5 | 239 |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | 50.9 |
| Cobalt | 2.5 | 4.79 |
| Copper | 1 | 34.5 |
| Lead | 5 | 484 |
| Mercury* | .05 | 0.07 |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 33.1 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 49.6 |
| Zinc | 5 | 65.6 |

* EPA METHOD 7471
**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

| | | | |
|--------------|----------------------------|------------------|----------|
| CLIENT: | Woodward-Clyde Consultants | DATE COLLECTED: | 05/11/93 |
| PROJECT: | Carter Park - 93C0243A | DATE RECEIVED: | 05/12/93 |
| BATCH NO.: | 93E048 | DATE EXTRACTED: | 05/18/93 |
| SAMPLE ID: | B-13-1 | DATE ANALYZED: | 05/19/93 |
| CONTROL NO.: | 93E048-60 | MATRIX: | Soil |
| % MOISTURE: | NA | DILUTION FACTOR: | 1 |

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| Antimony | 15 | ND |
| Arsenic** | 5 | 96.6 |
| Barium | 2.5 | 514 |
| Beryllium | .75 | ND |
| Cadmium | 1 | 1.13 |
| Chromium | 2.5 | 49.6 |
| Cobalt | 2.5 | 7.86 |
| Copper | 1 | 49.4 |
| Lead | 5 | 1160 |
| Mercury* | .05 | 0.25 |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | 35.7 |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | 67.9 |
| Zinc | 5 | 515 |

* EPA METHOD 7471

**Analyzed by GFAA

EPA METHOD 3050/6010
CAM METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:   NA
BATCH NO.:   93E048                       DATE EXTRACTED:  05/18/93
SAMPLE ID:   METHOD BLANK                  DATE ANALYZED:   05/19/93
CONTROL NO.: 93E048-BLK                   MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|------------|----------------------|-------------------|
| ----- | ----- | ----- |
| Antimony | 15 | ND |
| Arsenic** | 5 | ND |
| Barium | 2.5 | ND |
| Beryllium | .75 | ND |
| Cadmium | 1 | ND |
| Chromium | 2.5 | ND |
| Cobalt | 2.5 | ND |
| Copper | 1 | ND |
| Lead | 5 | ND |
| Mercury* | .05 | ND |
| Molybdenum | 2.5 | ND |
| Nickel | 2.5 | ND |
| Selenium | 15 | ND |
| Silver | 1 | ND |
| Thallium | 20 | ND |
| Vanadium | 2.5 | ND |
| Zinc | 5 | ND |

* EPA METHOD 7471
**Analyzed by GFAA

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93E048
SAMPLE ID: B-15-4
CONTROL NO.: 93E048-04
DATE RECEIVED: 05/12/93
DATE EXTRACTED: 05/18/93
DATE ANALYZED: 05/19/93
ACCESSION: 93E048

| Parameter | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|------------|-----------------------------|---------------------------------|----------------------|
| Antimony | ND | ND | 0 |
| Arsenic** | ND | ND | 0 |
| Barium | 156 | 177 | 13 |
| Beryllium | ND | ND | 0 |
| Cadmium | ND | ND | 0 |
| Chromium | 64.3 | 67.1 | 4 |
| Cobalt | 12.4 | 9.61 | 25 |
| Copper | 81.4 | 50.6 | 47 |
| Lead | 9.61 | 9.89 | 3 |
| Mercury* | ND | ND | 0 |
| Molybdenum | ND | ND | 0 |
| Nickel | 57 | 53.2 | 7 |
| Selenium | ND | ND | 0 |
| Silver | ND | ND | 0 |
| Thallium | ND | ND | 0 |
| Vanadium | 52.8 | 52.4 | 1 |
| Zinc | 75 | 59.7 | 23 |

* EPA METHOD 7471
**Analyzed by GFAA

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

| | | | |
|--------------|-----------|-----------------|----------|
| BATCH NO.: | 93E048 | DATE RECEIVED: | 05/12/93 |
| SAMPLE ID: | B-15-4 | DATE EXTRACTED: | 05/18/93 |
| CONTROL NO.: | 93E048-04 | DATE ANALYZED: | 05/19/93 |
| | | | |
| ACCESSION: | 93E048 | | |

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|------------|--------------------------|------------------------|-------------------------|---------------------|
| ----- | ----- | ----- | ----- | ----- |
| Antimony | ND | 100 | 37.2 | 37 |
| Arsenic** | ND | 100 | 112 | 112 |
| Barium | 156 | 100 | 266 | 110 |
| Beryllium | ND | 100 | 97.1 | 97 |
| Cadmium | ND | 100 | 95 | 95 |
| Chromium | 64.3 | 100 | 162 | 98 |
| Cobalt | 12.4 | 100 | 108 | 95 |
| Copper | 81.4 | 100 | 129 | 48 |
| Lead | 9.61 | 100 | 108 | 98 |
| Mercury* | ND | 0.83 | 0.78 | 94 |
| Molybdenum | ND | 100 | 84.1 | 84 |
| Nickel | 57 | 100 | 157 | 100 |
| Selenium | ND | 100 | 41.4 | 41 |
| Silver | ND | 100 | 88.1 | 88 |
| Thallium | ND | 100 | 108 | 108 |
| Vanadium | 52.8 | 100 | 151 | 99 |
| Zinc | 75 | 100 | 145 | 70 |

* EPA METHOD 7471
**Analyzed by GFAA

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|------------|--------------------------|------------------------|-------------------------|---------------------|
| Antimony | ND | 100 | 96.8 | 97 |
| Arsenic** | ND | 100 | 107 | 107 |
| Barium | ND | 100 | 97.9 | 98 |
| Beryllium | ND | 100 | 96.3 | 96 |
| Cadmium | ND | 100 | 97.1 | 97 |
| Chromium | ND | 100 | 100 | 100 |
| Cobalt | ND | 100 | 99.5 | 99 |
| Copper | ND | 100 | 99.2 | 99 |
| Lead | ND | 100 | 97.9 | 98 |
| Molybdenum | ND | 100 | 98.8 | 99 |
| Nickel | ND | 100 | 99.3 | 99 |
| Selenium | ND | 100 | 104 | 104 |
| Silver | ND | 100 | 89.9 | 90 |
| Thallium | ND | 100 | 94.8 | 95 |
| Vanadium | ND | 100 | 99.7 | 100 |
| Zinc | ND | 100 | 96.9 | 97 |

CKY INC., ANALYTICAL LABORATORIES, 630 Maple Ave., Torrance, Calif. 90503 Tel. (310) 618-8889 Fax: (310) 618-0818

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                     DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-25-7                     DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-07                  MATRIX:        Soil
% MOISTURE:   NA                        DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | 6.04 |
| Lead | 5 | 6.62 |
| Zinc | 5 | 53.8 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                        DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-24-1                        DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-08                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 9.2 |
| Lead | 5 | ND |
| Zinc | 5 | 177 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-24-2                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-09                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 34.2 |
| Lead | 5 | 10.7 |
| Zinc | 5 | 51.7 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                     DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-24-3                     DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-10                  MATRIX:         Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | 8.7 |
| Lead | 5 | 5.86 |
| Zinc | 5 | 44.1 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-24-4                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-11                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 6.5 |
| Lead | 5 | 5.87 |
| Zinc | 5 | 46.8 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/91
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-24-5                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-12                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 10.3 |
| Lead | 5 | ND |
| Zinc | 5 | 52.1 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-23-1                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-13                    MATRIX:        Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | 12.6 |
| Lead | 5 | 1100 |
| Zinc | 5 | 113 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-23-2                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-14                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | 6.04 |
| Lead | 5 | 1310 |
| Zinc | 5 | 73.1 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                     DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-23-3                     DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-15                  MATRIX:         Soil
.% MOISTURE:  NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 10.4 |
| Zinc | 5 | 38.7 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-23-4                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-16                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 6.21 |
| Zinc | 5 | 37.8 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                     DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-22-1                     DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-17                   MATRIX:         Soil
% MOISTURE:   NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 6.81 |
| Lead | 5 | 115 |
| Zinc | 5 | 133 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-22-2                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-18                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 5.59 |
| Lead | 5 | 319 |
| Zinc | 5 | 42.4 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-22-3                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-19                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 18 |
| Zinc | 5 | 47.9 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-22-4                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-20                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | 8.81 |
| Lead | 5 | ND |
| Zinc | 5 | 68.3 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-21-2                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-23                    MATRIX:         Soil
% MOISTURE:   NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 91 |
| Zinc | 5 | 56.7 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                        DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-21-3                         DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-24                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 111 |
| Zinc | 5 | 60.1 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-21-4                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-25                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 5.89 |
| Lead | 5 | 8.61 |
| Zinc | 5 | 41.4 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                     DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-21-6                     DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-27                  MATRIX:         Soil
% MOISTURE:  NA                         DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 5.68 |
| Zinc | 5 | 47 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-26-1                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-28                     MATRIX:         Soil
% MOISTURE:   NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | 6.91 |
| Lead | 5 | 12.6 |
| Zinc | 5 | 83 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-26-2                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-29                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 8.07 |
| Zinc | 5 | 54.5 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-26-3                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-30                    MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | 8.09 |
| Zinc | 5 | 44.4 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED: 06/24/93
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:  06/25/93
BATCH NO.:   93F128                       DATE EXTRACTED: 06/28/93
SAMPLE ID:   B-26-4                       DATE ANALYZED:  06/29/93
CONTROL NO.: 93F128-31                     MATRIX:         Soil
% MOISTURE:  NA                           DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | 6.83 |
| Zinc | 5 | 51.7 |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants    DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A        DATE RECEIVED:   NA
BATCH NO.:   93F128                       DATE EXTRACTED:  06/28/93
SAMPLE ID:   METHOD BLANK 1                 DATE ANALYZED:   06/29/93
CONTROL NO.: 93F128-BLK1                   MATRIX:         Soil
% MOISTURE:  NA                             DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | ND |

**Analyzed by GFAA

EPA METHOD 3050/6010
METALS BY ICP

```
=====
CLIENT:      Woodward-Clyde Consultants   DATE COLLECTED:  NA
PROJECT:     Carter Park - 93C0243A      DATE RECEIVED:   NA
BATCH NO.:   93F128                     DATE EXTRACTED:  06/28/93
SAMPLE ID:   METHOD BLANK 2              DATE ANALYZED:   06/29/93
CONTROL NO.: 93F128-BLK2                MATRIX:         Soil
% MOISTURE:  NA                          DILUTION FACTOR: 1
=====
```

| Element | Det Limit (mg/kg) | RESULT (mg/kg) |
|-----------|----------------------|-------------------|
| ----- | ----- | ----- |
| Arsenic** | 5 | ND |
| Lead | 5 | ND |
| Zinc | 5 | ND |

**Analyzed by GFAA

QUALITY CONTROL DATA

CLIENT: Woodward Clyde Consultants
PROJECT: Carter Park/93C0243A-2000
CONTROL NO: 93F128

METHOD: EPA 9045
DATE ANALYZED: 06/28/93
MATRIX: Soil

SAMPLE ID: 93F128-23

| <u>PARAMETER</u> | <u>SAMPLE RESULT</u> (pH unit) | DUP. <u>SAMPLE RESULT</u> (pH unit) | <u>%RPD</u> |
|------------------|---------------------------------------|-----------------------------------------------|-------------|
|------------------|---------------------------------------|-----------------------------------------------|-------------|

| | | | |
|----|------|------|---|
| pH | 7.29 | 7.33 | 0 |
|----|------|------|---|

METHOD: EPA 9045
DATE ANALYZED: 06/28/93
MATRIX: Soil

SAMPLE ID: 93F128-23

| <u>PARAMETER</u> | <u>SAMPLE RESULT</u> (pH unit) | DUP. <u>SAMPLE RESULT</u> (pH unit) | <u>%RPD</u> |
|------------------|---------------------------------------|-----------------------------------------------|-------------|
|------------------|---------------------------------------|-----------------------------------------------|-------------|

| | | | |
|----|------|------|---|
| pH | 5.91 | 5.92 | 0 |
|----|------|------|---|

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

=====

BATCH NO.: 93F128
SAMPLE ID: B-25-1
CONTROL NO.: 93F128-01

ACCESSION: 93F128

DATE RECEIVED: 06/25/93
DATE EXTRACTED: 06/28/93
DATE ANALYZED: 06/29/93

| Parameter | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|-----------|-----------------------------|---------------------------------|----------------------|
| ----- | ----- | ----- | ----- |
| Arsenic** | 3.53 | 5.32 | 40 + |
| Lead | 8.0 | 5.37 | 39 + |
| Zinc | 65.5 | 54.9 | 18 |

** Analyzed by GFAA

+ Arsenic and Lead RPD's were out of the control limit of 20%.
Either non-homogeneous samples or the fact that these results were very close to the detection limit would have created this error. Since the matrix spike and the RPD of laboratory control samples were within the QC limits. No corrective action.

CKY QUALITY CONTROL DATA
DUPLICATE SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93F128 DATE RECEIVED: 06/25/93
SAMPLE ID: B-21-2 DATE EXTRACTED: 06/28/93
CONTROL NO.: 93F128-23 DATE ANALYZED: 06/29/93
ACCESSION: 93F128

| Parameter | SAMPLE RESULT (mg/kg) | DUP SAMPLE RESULT (mg/kg) | RPD RESULT (%) |
|-----------|-----------------------------|---------------------------------|----------------------|
| Arsenic** | 4.65 | 7.75 | 50 + |
| Lead | 91 | 88.7 | 3 |
| Zinc | 56.7 | 59.9 | 5 |

**Analyzed by GFAA

+ Arsenic RPD was out of the control limit of 20%. A non-homogeneous sample was suspected since the matrix spike and the RPD of laboratory control samples were within the QC limits. No corrective action.

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

BATCH NO.: 93F128
SAMPLE ID: B-21-2
CONTROL NO.: 93F128-23
DATE RECEIVED: 06/25/93
DATE EXTRACTED: 06/28/93
DATE ANALYZED: 06/29/93
ACCESSION: 93F128

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|-----------|--------------------------|------------------------|-------------------------|---------------------|
| Arsenic** | 4.65 | 100 | 118 | 113 |
| Lead | 91 | 100 | 152 | 61 + |
| Zinc | 56.7 | 100 | 149 | 92 |

**Analyzed by GFAA

+ Lead spike recovery was out of the control limit of 75 - 125%.
A matrix effect was suspected since the other matrix spike and the
laboratory control samples were within the QC limits.
No corrective action.

CKY QUALITY CONTROL DATA
SPIKE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

=====

| | | | |
|--------------|-----------|-----------------|----------|
| BATCH NO.: | 93F128 | DATE RECEIVED: | 06/25/93 |
| SAMPLE ID: | B-25-1 | DATE EXTRACTED: | 06/28/93 |
| CONTROL NO.: | 93F128-01 | DATE ANALYZED: | 06/29/93 |
| ACCESSION: | 93F128 | | |

| Parameter | SAMPLE RESULT (mg/kg) | SPIKE CONC. (mg/kg) | SPIKE RESULT (mg/kg) | SPIKE RECRY. (%) |
|-----------|--------------------------|------------------------|-------------------------|---------------------|
| ----- | ----- | ----- | ----- | ----- |
| Arsenic** | 3.53 | 100 | 111 | 107 |
| Lead | 8.0 | 100 | 97.7 | 90 |
| Zinc | 65.5 | 100 | 140 | 75 |

**Analyzed by GFAA



CKY QUALITY CONTROL DATA
LABORATORY CONTROL SAMPLE ANALYSIS

CLIENT: Woodward-Clyde Consultants
PROJECT: Carter Park - 93C0243A
METHOD: EPA 3050/6010
MATRIX: Soil

=====

BATCH NO.: 93F128 DATE RECEIVED: NA
SAMPLE ID: LCS 216 DATE EXTRACTED: 06/28/93
CONTROL NO.: 93F128-LCS1 and LCS2 DATE ANALYZED: 06/29/93

ACCESSION: 93F128

| Parameter | TRUE VALUE (mg/kg) | LCS1 FOUND VALUE (mg/kg) | LCS2 FOUND VALUE (mg/kg) | RPD (%) | ACCEPTANCE RAN (mg/kg) |
|-----------|-----------------------|--------------------------------|--------------------------------|------------|---------------------------|
| ----- | ----- | ----- | ----- | --- | ----- |
| Arsenic** | 67.7 | 84.2 | 90.3 | 7 | 41 - 105 |
| Lead | 100 | 82.0 | 80.8 | 1 | 55 - 140 |
| Zinc | 197 | 163 | 162 | 1 | 98 - 280 |

** Analyzed by GFAA

93F128

DUE 7-1-93

CKY Lab. (H4) 10.F2

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. *Center Park*
93C0243A-2000

SAMPLERS: (Signature)

Bill [Signature]

ANALYSES

REMARKS
(Sample
preservation,
handling
procedures, etc.)

| DATE | TIME | SAMPLE NUMBER | Sample Matrix (Soil, Water, Air) | EPA Method | EPA Method | EPA Method | EPA Method | HOLD samples pending analysis request | Pb, Zn (GOLD) | As (GFAA) | pH (9040/9045) | Number of Containers | REMARKS (Sample preservation, handling procedures, etc.) |
|------|---------|---------------|-------------------------------------|------------|------------|------------|------------|------------------------------------------|---------------|-----------|----------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 9/24/93 | 0934 | B-25-1 | S | | | | X | X | X | X | 1 | All samples in brass or stainless steel 2" x 6" liners Hold all samples pending analysis request Send results to Mike McGuire (510) 874-3288 5 day TAT All samples on ice in one ice chest. RUSH |
| 2 | | 0938 | B-25-2 | S | | | | X | X | X | X | 1 | |
| 3 | | 0942 | B-25-3 | S | | | | X | X | X | X | 1 | |
| 4 | | 0946 | B-25-4 | S | | | | X | X | X | X | 1 | |
| 5 | | 0950 | B-25-5 | S | | | | X | X | X | X | 1 | |
| 6 | | 0954 | B-25-6 | S | | | | X | X | X | X | 1 | |
| 7 | | 0958 | B-25-7 | S | | | | X | X | X | X | 1 | |
| 8 | | 1031 | B-24-1 | S | | | | X | X | X | X | 1 | |
| 9 | | 1036 | B-24-2 | S | | | | X | X | X | X | 1 | |
| 10 | | 1041 | B-24-3 | S | | | | X | X | X | X | 1 | |
| 11 | | 1052 | B-24-4 | S | | | | X | X | X | X | 1 | |
| 12 | | 1059 | B-24-5 | S | | | | X | X | X | X | 1 | |
| 13 | | 1131 | B-23-1 | S | | | | X | X | X | X | 1 | |
| | | 1140 | B-23-2 | S | | | | X | X | X | X | 1 | |
| 15 | | 1205 | B-23-3 | S | | | | X | X | X | X | 1 | |
| 16 | | 1216 | B-23-4 | S | | | | X | X | X | X | 1 | |
| 17 | | 1308 | B-22-1 | S | | | | X | X | X | X | 1 | |
| 18 | | 1332 | B-22-2 | S | | | | X | X | X | X | 1 | |
| 19 | | 1336 | B-22-3 | S | | | | X | X | X | X | 1 | |
| 20 | | 1340 | B-22-4 | S | | | | X | X | X | X | 1 | |
| 21 | | 1403 | B-22-5 | S | | | | X | X | X | X | 1 | |
| 22 | | 1434 | B-21-1 | S | | | | X | X | X | X | 1 | |
| 23 | | 1438 | B-21-2 | S | | | | X | X | X | X | 1 | |
| 24 | | 1440 | B-21-3 | S | | | | X | X | X | X | 1 | |
| 25 | | 1453 | B-21-4 | S | | | | X | X | X | X | 1 | |
| 26 | | 1456 | B-21-5 | S | | | | X | X | X | X | 1 | |
| 27 | | 1505 | B-21-6 | S | | | | X | X | X | X | 1 | |
| 28 | | 1537 | B-26-1 | S | | | | X | X | X | X | 1 | |

TOTAL
NUMBER OF
CONTAINERS

28

RELINQUISHED BY:
(Signature)*30 [Signature]*

DATE/TIME

6/24/93

RECEIVED BY:
(Signature)*[Signature]*RELINQUISHED BY:
(Signature)

DATE/TIME

1

RECEIVED BY:
(Signature)

METHOD OF SHIPMENT:

FED EX
AIRBILL # 7510 22 4013SHIPPED BY:
(Signature)COURIER:
(Signature)RECEIVED FOR LAB BY:
(Signature)*[Signature]*

DATE/TIME

6/25/93 11:00 AM

93F128

DUE 7-1-93

CKT Lab. (H4) Lot 2

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. *Center Park*
930243A-2000

SAMPLERS: (Signature)

Bill [Signature]

ANALYSES

Sample Matrix
(Soil, Water, Air)

EPA Method

EPA Method

EPA Method

EPA Method

*Holds samples
pending analysis
request**Pb, Zn (6010)**As (GFAA)**pH (9040, 9045)*

Number of Containers

REMARKS
(Sample
preservation,
handling
procedures, etc.)

| DATE | TIME | SAMPLE NUMBER |
|------------|------|---------------|
| 29 6/24/93 | 1545 | B-26-2 |
| 30 | 1553 | B-26-3 |
| 31 | 1613 | B-26-4 |

S

S

S

XXX

XXX

XXX

XXX

1

1

1

*See pg 1.**Send Results
to
Mike McGuire
(510) 874-3288**5 day
TAT*

RUSH

TOTAL
NUMBER OF
CONTAINERS

3

RELINQUISHED BY:
(Signature)*Bill [Signature]*

DATE/TIME

*6/24/93 1730*RECEIVED BY:
(Signature)*[Signature]*RELINQUISHED BY:
(Signature)*[Signature]*

DATE/TIME

*1*RECEIVED BY:
(Signature)*[Signature]*

METHOD OF SHIPMENT:

FED EX
*AIRBILL # 7510224013*SHIPPED BY:
(Signature)*[Signature]*COURIER:
(Signature)*[Signature]*RECEIVED FOR LAB BY:
(Signature)*[Signature]*

DATE/TIME

*6/24 11:00
193*



ANALYTICAL SCHEDULE

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D.: 306330

| Analysis | Technique/Description |
|-----------------------------------------------------|------------------------------------|
| EPA 340.2 (FLUORIDE) | ELECTRODE |
| EPA 353.2 (NITRATE AS NITROGEN) | COLORIMETRIC |
| EPA 376.2 (SULFIDE) | COLORIMETRIC |
| EPA 6010 (ANTIMONY) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (BARIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (BERYLLIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (CALCIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (CHROMIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (COBALT) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (COPPER) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (IRON) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (LEAD) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (MAGNESIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (MOLYBDENUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (NICKEL) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (POTASSIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (SILVER) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (SODIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (VANADIUM) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (ZINC) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 7060 (ARSENIC) | ATOMIC ABSORPTION/GRAPHITE FURNACE |
| EPA 7131 (CADMIUM) | ATOMIC ABSORPTION/GRAPHITE FURNACE |
| EPA 7471 (NON AQUEOUS MERCURY) | ATOMIC ABSORPTION/COLD VAPOR |
| EPA 7740 (SELENIUM) | ATOMIC ABSORPTION/GRAPHITE FURNACE |
| EPA 7841 (THALLIUM) | ATOMIC ABSORPTION/GRAPHITE FURNACE |
| EPA 9012 (TOTAL CYANIDE) | COLORIMETRIC |
| EPA 9038 (SULFATE) | TURBIDIMETRIC |
| EPA 9045 (pH SOIL) | ELECTRODE |
| EPA 9253 (CHLORIDE) | TITRIMETRIC, SILVER NITRATE |
| METHOD 7-2.2, METHODS OF SOIL ANALYSIS (% MOISTURE) | GRAVIMETRIC |
| MOD EPA 9050 (ELECTRICAL CONDUCTIVITY) | ELECTRODE |

GENERAL CHEMISTRY RESULTS

Pa. J

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D.: 306330

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-----------|--------|--------------|---------------|
| 1 | COURT-1 | SOIL | 28-JUN-93 | 29-JUN-93 |

| Parameter | Units | 1 |
|-------------------------|----------|-------|
| CHLORIDE | MG/KG | <5.0 |
| TOTAL CYANIDE | MG/KG | <0.10 |
| ELECTRICAL CONDUCTIVITY | UMHOS/CM | 2720 |
| FLUORIDE | MG/KG | <5 |
| % MOISTURE | % | 9.56 |
| NITRATE AS NITROGEN | MG/KG | <0.50 |
| pH | UNITS | 3.0 |
| SULFIDE | MG/KG | <0.20 |
| SULFATE | MG/KG | 2160 |



DUP/MS

Page

Client : WOODWARD-CLYDE CONSULTANTS

Project # : 93C0243A

ATI I.D. : 30633

Project Name: NONE

| Parameters | REF I.D. | Units | Sample Result | Dup Result | RPD | Spiked Sample | Spike Conc | % Rec |
|-------------------------|-----------|----------|---------------|------------|-----|---------------|------------|-------|
| % MOISTURE | 306330-01 | % | 9.56 | 10.6 | 10 | N/A | N/A | N/A |
| CHLORIDE | 306330-01 | MG/KG | <5.0 | <5.0 | 0 | 44.0 | 40.0 | 110 |
| ELECTRICAL CONDUCTIVITY | 306330-01 | UMHOS/CM | 2720 | 2870 | 5 | N/A | N/A | N/A |
| FLUORIDE | 306317-02 | MG/KG | <5 | <5 | 0 | 4.1 | 5.0 | 82 |
| NITRATE AS NITROGEN | 306261-10 | MG/KG | <0.50 | <0.50 | 0 | 10.9 | 10.0 | 109 |
| SULFATE | 306334-02 | MG/KG | 225 | 225 | 0 | 570 | 407 | 85 |
| SULFIDE | 306235-05 | MG/KG | 170 | 160 | 6 | 188 | 4.0 | N/A* |
| TOTAL CYANIDE | 306309-19 | MG/KG | <0.10 | <0.10 | 0 | 2.3 | 2.2 | 105 |
| pH | 306317-02 | UNITS | 7.8 | 7.8 | 0 | N/A | N/A | N/A |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration

RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

*V SAMPLE RESULT IS >4X SPIKED CONCENTRATION, THEREFORE SPIKE IS NOT DETECTABLE.



GENERAL CHEMISTRY - QUALITY CONTROL

BLANK SPIKE

Page 5

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D. : 306330

| Parameters | Blank Spike ID# | Units | Blank Result | Spiked Sample | Spike Conc. | % Rec |
|---------------------|--------------------|-------|-----------------|------------------|----------------|----------|
| CHLORIDE | 37401 | MG/KG | <5.0 | 42.0 | 40.0 | 105 |
| FLUORIDE | 37351 | MG/KG | <5 | 4.9 | 5.0 | 98 |
| NITRATE AS NITROGEN | 37349 | MG/KG | <0.50 | 11.7 | 10.0 | 117 |
| SULFATE | 37364 | MG/KG | <100 | 212 | 200 | 106 |
| SULFIDE | 37318 | MG/KG | <0.20 | 1.0 | 1.0 | 100 |
| TOTAL CYANIDE | 37315 | MG/KG | <0.10 | 1.8 | 2.0 | 90 |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result



METALS RESULTS

Page

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D.: 30633

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-----------|--------|--------------|---------------|
| 1 | COURT-1 | SOIL | 28-JUN-93 | 29-JUN-9 |

| Parameter | Units | 1 |
|------------|-------|-------|
| SILVER | MG/KG | 5.9 |
| ARSENIC | MG/KG | 397 |
| BARIUM | MG/KG | 612 |
| BERYLLIUM | MG/KG | <0.5 |
| CALCIUM | MG/KG | 730 |
| CADMIUM | MG/KG | <0.5 |
| COBALT | MG/KG | <1.0 |
| CHROMIUM | MG/KG | 3.2 |
| COPPER | MG/KG | 48.3 |
| IRON | MG/KG | 23400 |
| MERCURY | MG/KG | 4.72 |
| POTASSIUM | MG/KG | 1140 |
| MAGNESIUM | MG/KG | 157 |
| MOLYBDENUM | MG/KG | 11.9 |
| SODIUM | MG/KG | 525 |
| NICKEL | MG/KG | 1.1 |
| LEAD | MG/KG | 594 |
| ANTIMONY | MG/KG | 10.7 |
| SELENIUM | MG/KG | 2.9 |
| THALLIUM | MG/KG | 47.7 |
| VANADIUM | MG/KG | 0.9 |
| ZINC | MG/KG | 291 |

METALS - QUALITY CONTROL

DUP/MS

Page 7

Client : WOODWARD-CLYDE CONSULTANTS
 Project # : 93C0243A
 Project Name: NONE

ATI I.D. : 306330

| Parameters | REF I.D. | Units | Sample Result | Dup Result | RPD | Spiked Sample | Spike Conc | % Rec |
|------------|-----------|-------|---------------|------------|------|---------------|------------|-------|
| ANTIMONY | 306309-10 | MG/KG | 6.7 | 11.5 | 53@R | 50.5 | 49.1 | 89 |
| ARSENIC | 306317-02 | MG/KG | 1.7 | 1.8 | 6 | 46.7 | 49.8 | 90 |
| BARIUM | 306309-10 | MG/KG | 29.1 | 31.2 | 7 | 127 | 98.2 | 100 |
| BERYLLIUM | 306309-10 | MG/KG | <0.5 | <0.5 | 0 | 47.1 | 49.1 | 96 |
| CADMIUM | 306317-02 | MG/KG | <0.5 | <0.5 | 0 | 51.2 | 49.8 | 103 |
| CALCIUM | 306309-10 | MG/KG | 2200 | 2350 | 7 | N/A | 491 | N/A* |
| CHROMIUM | 306309-10 | MG/KG | 8.3 | 8.7 | 5 | 54.5 | 49.1 | 94 |
| COBALT | 306309-10 | MG/KG | 4.0 | 4.6 | 14 | 95.8 | 98.2 | 93 |
| COPPER | 306309-10 | MG/KG | 35.0 | 34.1 | 3 | 81.9 | 49.1 | 96 |
| IRON | 306309-10 | MG/KG | 8720 | 9510 | 9 | N/A | 98.2 | N/A* |
| LEAD | 306309-10 | MG/KG | 433 | 387 | 11 | N/A | 49.1 | N/A* |
| MAGNESIUM | 306309-10 | MG/KG | 1540 | 1700 | 10 | N/A | 246 | N/A* |
| MERCURY | 306330-01 | MG/KG | 4.72 | 3.78 | 22 | 5.64 | 0.95 | 97 |
| MOLYBDENUM | 306309-10 | MG/KG | <1.0 | 1.0 | 0 | 93.5 | 98.2 | 95 |
| NICKEL | 306309-10 | MG/KG | 9.9 | 10.2 | 3 | 58.1 | 49.1 | 98 |
| POTASSIUM | 306309-10 | MG/KG | 252 | 279 | 10 | 520 | 246 | 109 |
| SELENIUM | 306317-02 | MG/KG | 2.4 | 2.5 | 4 | 31.1 | 29.9 | 96 |
| SILVER | 306309-10 | MG/KG | <1.0 | <1.0 | 0 | 40.5 | 49.1 | ? |
| SODIUM | 306309-10 | MG/KG | 204 | 226 | 10 | 896 | 614 | 1 |
| THALLIUM | 306317-02 | MG/KG | <1.0 | <1.0 | 0 | 31.6 | 49.8 | 63 |
| VANADIUM | 306309-10 | MG/KG | 23.3 | 27.8 | 18 | 116 | 98.2 | 94 |
| ZINC | 306309-10 | MG/KG | 105 | 97.1 | 8 | 137 | 48.9 | 65 |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
 RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

*V SAMPLE RESULT IS >4X SPIKED CONCENTRATION, THEREFORE SPIKE IS NOT DETECTABLE.
 @R RPD LIMIT IS 67% FOR INORGANIC RESULTS LESS THAN TEN TIMES THE REPORTING DETECTION LIMIT.



METALS - QUALITY CONTROL

BLANK SPIKE

Page 6

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: NONE

ATI I.D. : 306330

| Parameters | Blank Spike ID# | Units | Blank Result | Spiked Sample | Spike Conc. | % Rec |
|------------|--------------------|-------|-----------------|------------------|----------------|----------|
| ANTIMONY | 37410 | MG/KG | <3.0 | 44.2 | 50.0 | 88 |
| ARSENIC | 37316 | MG/KG | <1.0 | 47.3 | 50.0 | 95 |
| BARIUM | 37410 | MG/KG | <0.5 | 89.1 | 100 | 89 |
| BERYLLIUM | 37410 | MG/KG | <0.5 | 44.8 | 50.0 | 90 |
| CADMIUM | 37333 | MG/KG | <0.5 | 53.1 | 50.0 | 106 |
| CALCIUM | 37410 | MG/KG | <2.5 | 443 | 500 | 89 |
| CHROMIUM | 37410 | MG/KG | <0.5 | 42.9 | 50.0 | 86 |
| COBALT | 37410 | MG/KG | <1.0 | 89.6 | 100 | 90 |
| COPPER | 37410 | MG/KG | 1.2 | 45.6 | 50.0 | 89 |
| IRON | 37410 | MG/KG | 3.7 | 92.8 | 100 | 89 |
| LEAD | 37410 | MG/KG | <1.5 | 44.7 | 50.0 | 89 |
| MAGNESIUM | 37410 | MG/KG | <0.5 | 222 | 250 | 89 |
| MERCURY | 37365 | MG/KG | <0.25 | 0.89 | 1.00 | 89 |
| MOLYBDENUM | 37410 | MG/KG | <1.0 | 91.8 | 100 | 92 |
| NICKEL | 37410 | MG/KG | <1.0 | 45.6 | 50.0 | 91 |
| POTASSIUM | 37410 | MG/KG | <5.0 | 223 | 250 | 89 |
| SELENIUM | 37310 | MG/KG | <1.0 | 30.5 | 30.0 | 102 |
| SILVER | 37410 | MG/KG | <1.0 | 44.2 | 50.0 | 88 |
| SODIUM | 37410 | MG/KG | 2.6 | 502 | 625 | 80 |
| THALLIUM | 37309 | MG/KG | <1.0 | 43.4 | 50.0 | 87 |
| VANADIUM | 37410 | MG/KG | <0.5 | 89.3 | 100 | 89 |
| ZINC | 37410 | MG/KG | <1.0 | 42.4 | 50.0 | 85 |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration

RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

SAMPLE CONDITION UPON RECEIPT CHECKLIST (FOR RE-ACCESSIONS, COMPLETE #7 THRU #9)

| | | | |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| 1 | Does this project require special handling according to NEESA Levels C, D, AFOEHL or CLP protocols? If yes, complete a) thru c) a) Cooler temperature _____ b) pH sample aliquoted: yes / no / n/a c) LOT #'s: _____ | YES | <u>NO</u> |
| 2 | Are custody seals present on cooler? If yes, are seals intact? | YES | <u>NO</u> |
| | <u>N/A</u> | YES | NO |
| 3 | Are custody seals present on sample containers? If yes, are seals intact? | YES | <u>NO</u> |
| | <u>N/A</u> | YES | NO |
| 4 | Is there a Chain-Of-Custody (COC)*? | <u>YES</u> | NO |
| 5 | Is the COC* complete? Relinquished: yes/no Requested analysis: yes/no | <u>YES</u> | NO |
| 6 | Is the COC* in agreement with the samples received? # Samples: yes/no Sample ID's: yes/no Matrix: yes/no # containers: yes/no | <u>YES</u> | NO |
| 7 | Are the samples preserved correctly? | <u>YES</u> | NO |
| 8 | Is there enough sample for all the requested analyses? | <u>YES</u> | NO |
| 9 | Are all samples within holding times for the requested analyses? | <u>YES</u> | NO |
| 10 | Were the samples received cold? | YES | <u>NO</u> |
| 11 | Were all sample containers received intact (ie. not broken, leaking, etc.)? | <u>YES</u> | NO |
| 12 | Are samples requiring no headspace, headspace free? <u>N/A</u> | YES | NO |
| 13 | Are there special comments on the Chain of Custody which require client contact? | YES | <u>N/A</u> |
| 14 | If yes, was ATI Project Manager notified? | YES | NO |

Describe "no" items: 8) Sample is limited. 10) Sample sent in box with no ice. Client aware of this per EH.

Was client contacted? yes / no

If yes, Date: _____ Name of Person contacted: _____

Describe actions taken or client instructions: _____

*Or other representative documents, letters, and/or shipping memos

GENERAL CHEMISTRY RESULTS

Page

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

ATI I.D.: 30708

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-----------|--------|--------------|---------------|
| 1 | CRACK 1 | SOIL | 08-JUL-93 | 09-JUL-93 |
| 2 | COURT 2 | SOIL | 08-JUL-93 | 09-JUL-93 |

| Parameter | Units 1 | 2 |
|-----------|-----------|-----|
| pH | UNITS 1.5 | 2.8 |

GENERAL CHEMISTRY - QUALITY CONTROL

DUP/MS

Page

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: (NONE)

ATI I.D. : 30708

| Parameters | REF I.D. | Units | Sample Result | Dup Result | RPD | Spiked Sample | Spike Conc | % Rec |
|------------|-----------|-------|------------------|---------------|-----|------------------|---------------|----------|
| pH | 307084-02 | UNITS | 2.8 | 2.8 | 0 | N/A | N/A | N/A |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration

RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result



METALS RESULTS

Page

Client : WOODWARD-CLYDE CONSULTANTS

Project # : 93C0243A

ATI I.D.: 30708

Project Name: (NONE)

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-------------------|-------------|--------------|---------------|
| 3 | COURT 2/WET 02 | WET EXTRACT | 08-JUL-93 | 09-JUL-9 |
| 4 | COURT 2/DI WET 02 | WET EXTRACT | 08-JUL-93 | 09-JUL-9 |

| Parameter | Units | 3 | 4 |
|-----------|-------|--------|--------|
| ARSENIC | MG/L | 8.8 | <0.05 |
| MERCURY | MG/L | <0.005 | <0.005 |
| LEAD | MG/L | 0.4 | <0.03 |
| ZINC | MG/L | 4.1 | 3.3 |

METALS RESULTS

Page

Client : WOODWARD-CLYDE CONSULTANTS
 Project # : 93C0243A
 Project Name: (NONE)

ATI I.D.: 30706

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-----------|--------|--------------|---------------|
| 1 | CRACK 1 | SOIL | 08-JUL-93 | 09-JUL-9 |
| 2 | COURT 2 | SOIL | 08-JUL-93 | 09-JUL-9 |

| Parameter | Units | 1 | 2 |
|------------|-------|-------|--------|
| SILVER | MG/KG | - | 9.8 |
| ARSENIC | MG/KG | 14.4 | 734 |
| BARIUM | MG/KG | - | 332 |
| BERYLLIUM | MG/KG | - | <0.5 |
| CADMIUM | MG/KG | - | <1.0@H |
| COBALT | MG/KG | - | 1.2 |
| CHROMIUM | MG/KG | - | 8.4 |
| COPPER | MG/KG | - | 43.3 |
| MERCURY | MG/KG | <0.25 | 6.28 |
| MOLYBDENUM | MG/KG | - | 16.6 |
| NICKEL | MG/KG | - | 3.1 |
| LEAD | MG/KG | 5.5 | 692 |
| ANTIMONY | MG/KG | - | 16.2 |
| SELENIUM | MG/KG | - | 3.4 |
| THALLIUM | MG/KG | - | 62.1 |
| VANADIUM | MG/KG | - | 2.9 |
| ZINC | MG/KG | 7450 | 443 |

@H DETECTION LIMIT ELEVATED DUE TO MATRIX INTERFERENCE

METALS - QUALITY CONTROL

DUP/MS

Client : WOODWARD-CLYDE CONSULTANTS
 Project # : 93C0243A
 Project Name: (NONE)

Page
 ATI I.D. : 3070

| Parameters | REF I.D. | Units | Sample Result | Dup Result | RPD | Spiked Sample | Spike Conc | % Rec |
|------------|-----------|-------|---------------|------------|------|---------------|------------|-------|
| ANTIMONY | 307068-07 | MG/KG | <3.0 | <3.0 | 0 | 35.9 | 53.3 | 67 |
| ARSENIC | 307068-07 | MG/KG | 1.14 | 0.91 | 22@R | 52.3 | 54.2 | 94 |
| ARSENIC | 307084-03 | MG/L | 8.8 | 8.5 | 3 | 57.6 | 50.0 | 98 |
| ARSENIC | 307084-04 | MG/L | <0.05 | <0.05 | 0 | 5.00 | 5.00 | 100 |
| BARIUM | 307068-07 | MG/KG | 14.2 | 14.6 | 3 | 119 | 107 | 98 |
| BERYLLIUM | 307068-07 | MG/KG | <0.5 | <0.5 | 0 | 48.5 | 53.3 | 91 |
| CADMIUM | 307068-07 | MG/KG | <0.5 | <0.5 | 0 | 53.2 | 49.7 | 107 |
| CERONIUM | 307068-07 | MG/KG | 8.0 | 8.3 | 4 | 53.4 | 53.3 | 85 |
| COBALT | 307068-07 | MG/KG | 3.4 | 3.6 | 6 | 99.8 | 107 | 90 |
| COPPER | 307068-07 | MG/KG | 12.9 | 13.0 | 1 | 62.5 | 53.3 | 93 |
| LEAD | 307068-07 | MG/KG | 19.1 | 19.6 | 3 | 66.6 | 53.3 | 89 |
| LEAD | 307084-03 | MG/L | 0.4 | 0.5 | 22@R | 50.8 | 50.0 | 101 |
| LEAD | 307084-04 | MG/L | <0.03 | <0.03 | 0 | 5.27 | 5.00 | 105 |
| MERCURY | 307084-01 | MG/KG | <0.25 | <0.25 | 0 | 0.85 | 0.94 | 91 |
| MERCURY | 307084-03 | MG/L | <0.005 | <0.005 | 0 | 0.019 | 0.020 | 95 |
| MERCURY | 307084-04 | MG/L | <0.005 | <0.005 | 0 | 0.016 | 0.020 | 80 |
| LYSDENUM | 307068-07 | MG/KG | <1.0 | <1.0 | 0 | 95.5 | 107 | 89 |
| CKEL | 307068-07 | MG/KG | 5.2 | 5.3 | 2 | 53.0 | 53.3 | 90 |
| SELENIUM | 307068-07 | MG/KG | 1.8 | 1.8 | 0 | 34.5 | 32.5 | 101 |
| SILVER | 307068-07 | MG/KG | <1.0 | <1.0 | 0 | 40.1 | 53.3 | 75 |
| THALLIUM | 307068-07 | MG/KG | <1.0 | <1.0 | 0 | 58.4 | 54.2 | 108 |
| VANADIUM | 307068-07 | MG/KG | 28.5 | 28.2 | 1 | 123 | 107 | 88 |
| ZINC | 307068-07 | MG/KG | 37.9 | 38.5 | 2 | 83.2 | 53.3 | 85 |
| ZINC | 307084-03 | MG/L | 4.1 | 3.8 | 8 | 52.6 | 50.0 | 97 |
| ZINC | 307084-04 | MG/L | 3.3 | 3.5 | 6 | 8.2 | 5.0 | 99 |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration

RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

@R RPD LIMIT IS 67% FOR INORGANIC RESULTS LESS THAN TEN TIMES THE REPORTING DETECTION LIMIT.

METALS - QUALITY CONTROL

BLANK SPIKE

Page 8

Client : WOODWARD-CLYDE CONSULTANTS
 Project # : 93C0243A
 Project Name: (NONE)

ATI I.D. : 307084

| Parameters | Blank Spike ID# | Units | Blank Result | Spiked Sample | Spike Conc. | % Rec |
|------------|--------------------|-------|-----------------|------------------|----------------|----------|
| ANTIMONY | 37666 | MG/KG | <3.0 | 46.2 | 50.0 | 92 |
| ARSENIC | 37691 | MG/KG | <1.0 | 49.6 | 50.0 | 99 |
| ARSENIC | 37729 | MG/L | <0.5 | 49.5 | 50.0 | 99 |
| ARSENIC | 37731 | MG/L | <0.05 | 4.93 | 5.00 | 99 |
| BARIUM | 37666 | MG/KG | <0.5 | 95.4 | 100 | 95 |
| BERYLLIUM | 37666 | MG/KG | <0.5 | 46.8 | 50.0 | 94 |
| CADMIUM | 37714 | MG/KG | <0.5 | 52.1 | 50.0 | 104 |
| CHROMIUM | 37666 | MG/KG | <0.5 | 44.5 | 50.0 | 89 |
| COBALT | 37666 | MG/KG | <1.0 | 94.8 | 100 | 95 |
| COPPER | 37666 | MG/KG | <1.0 | 48.1 | 50.0 | 96 |
| LEAD | 37666 | MG/KG | <1.5 | 47.0 | 50.0 | 94 |
| LEAD | 37729 | MG/L | <0.3 | 50.7 | 50.0 | 101 |
| LEAD | 37731 | MG/L | <0.03 | 5.22 | 5.00 | 104 |
| MERCURY | 37723 | MG/KG | <0.25 | 0.93 | 1.00 | 93 |
| MERCURY | 37724 | MG/L | <0.005 | 0.018 | 0.020 | 90 |
| MERCURY | 37725 | MG/L | <0.005 | 0.022 | 0.020 | 1 |
| MOLYBDENUM | 37666 | MG/KG | <1.0 | 93.9 | 100 | 94 |
| NICKEL | 37666 | MG/KG | <1.0 | 46.8 | 50.0 | 94 |
| SELENIUM | 37745 | MG/KG | <0.25 | 28.1 | 30.0 | 94 |
| SILVER | 37666 | MG/KG | <1.0 | 50.4 | 50.0 | 101 |
| THALLIUM | 37747 | MG/KG | <1.0 | 45.7 | 50.0 | 91 |
| VANADIUM | 37666 | MG/KG | <0.5 | 92.2 | 100 | 92 |
| ZINC | 37666 | MG/KG | 2.2 | 46.2 | 50.0 | 88 |
| ZINC | 37730 | MG/L | <0.5 | 48.8 | 50.0 | 98 |
| ZINC | 37732 | MG/L | <0.05 | 5.0 | 5.0 | 100 |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
 RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

ACCESSION #: 307084

INITIALS: CE

**SAMPLE CONDITION UPON RECEIPT CHECKLIST
(FOR RE-ACCESSIONS, COMPLETE #7 THRU #9)**

| | | | |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| 1 | Does this project require special handling according to NEESA Levels C, D, AFOEHL or CLP protocols? If yes, complete a) thru c) a) Cooler temperature _____ b) pH sample aliquoted: yes / no / n/a c) LOT #'s: _____ | YES | <u>NO</u> |
| 2 | Are custody seals present on cooler? If yes, are seals intact? <u>N/A</u> | YES | <u>NO</u> |
| 3 | Are custody seals present on sample containers? If yes, are seals intact? <u>N/A</u> | YES | <u>NO</u> |
| 4 | Is there a Chain-Of-Custody (COC)*? | <u>YES</u> | NO |
| 5 | Is the COC* complete? Relinquished: <u>yes/no</u> Requested analysis: <u>yes/no</u> | <u>YES</u> | NO |
| 6 | Is the COC* in agreement with the samples received? # Samples: <u>yes/no</u> Sample ID's: <u>yes/no</u> Matrix: <u>yes/no</u> # containers: <u>yes/no</u> | <u>YES</u> | NO |
| 7 | Are the samples preserved correctly? | <u>YES</u> | NO |
| 8 | Is there enough sample for all the requested analyses? | <u>YES</u> | NO |
| 9 | Are all samples within holding times for the requested analyses? | <u>YES</u> | NO |
| 10 | Were the samples received cold? | <u>YES</u> | NO |
| 11 | Were all sample containers received intact (ie. not broken, leaking, etc.)? | <u>YES</u> | NO |
| 12 | Are samples requiring no headspace, headspace free? <u>N/A</u> <u>7/9/93</u> <u>YES</u> | <u>YES</u> | NO |
| 13 | Are there special comments on the Chain of Custody which require client contact? | YES | <u>N/A</u> |
| 14 | If yes, was ATI Project Manager notified? | YES | NO |

Describe "no" items: _____

Was client contacted? yes / no

If yes, Date: _____ Name of Person contacted: _____

Describe actions taken or client instructions: _____

*Or other representative documents, letters, and/or shipping memos

ATT # 307084

Woodward-Clyde Consultants

500 12th Street, Suite 100, Oakland, CA 94607-4041
(415) 893-3600

Chain of Custody Record

PROJECT NO.

9300243A

SAMPLERS: (Signature)

[Signature]

DATE

TIME

SAMPLE NUMBER

Sample Matrix
(Soil, Water, Air)

ANALYSES

EPA Method: pH
EPA Method: *[Signature]*
EPA Method: *[Signature]*
EPA Method: *[Signature]*

Number of Containers

REMARKS
(Sample preservation, handling procedures, etc.)

01
02

7/8 0800 Crack 1
7/8 0830 Crack 2

S X
S X X X X

X

1
1

* analyze
wet extracts
analyzed for
As, Pb, Hg, Zn
5-day
turn around
Results to
Mr. Mulgrew
ATE PM
Evelyn Hicks

TOTAL
NUMBER OF
CONTAINERS

2

RELINQUISHED BY:
(Signature)

[Signature]

DATE/TIME

7/8/95

RECEIVED BY:
(Signature)

[Signature]

RELINQUISHED BY:
(Signature)

[Signature]

DATE/TIME

7/8/95

RECEIVED BY:
(Signature)

[Signature]

METHOD OF SHIPMENT:

Federal Express

SHIPPED BY:
(Signature)

[Signature]

COURIER:
(Signature)

[Signature]

RECEIVED FOR LAB BY:
(Signature)

[Signature]

DATE/TIME

7/8/95



Analytical**Technologies**, Inc.

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

ATI I.D.: 307393

August 16, 1993

WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607

Project Name: MINING SOIL
Project # : 93C0243A

Attention: MICHAEL MCGUIRE

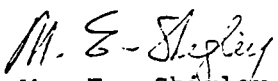
Analytical Technologies, Inc. has received the following sample(s):

| <u>Date Received</u> | <u>Quantity</u> | <u>Matrix</u> |
|----------------------|-----------------|---------------|
| July 31, 1993 | 9 | SOIL |

The sample(s) were analyzed with EPA methodology or equivalent methods as specified in the enclosed analytical schedule. The symbol for "less than" indicates a value below the reportable detection limit. Please note that the Sample Condition Upon Receipt Checklist is included at the end of this report.

The results of these analyses and the quality control data are enclosed.


EVELYN B. HICKS
PROJECT MANAGER


M. E. Shigley
LABORATORY MANAGER

SAMPLE CROSS REFERENCE

Page 1

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: MINING SOIL

Report Date: August 16, 1993
ATI I.D. : 307393

| ATI # | Client Description | Matrix | Date Collected |
|-------|--------------------|--------|----------------|
| 1 | CRACK A | SOIL | 30-JUL-93 |
| 2 | CRACK B | SOIL | 30-JUL-93 |
| 3 | CRACK C | SOIL | 30-JUL-93 |
| 4 | CRACK D | SOIL | 30-JUL-93 |
| 5 | CRACK E | SOIL | 30-JUL-93 |
| 6 | CRACK F | SOIL | 30-JUL-93 |
| 7 | CRACK G | SOIL | 30-JUL-93 |
| 8 | CRACK H | SOIL | 30-JUL-93 |
| 9 | CRACK J | SOIL | 30-JUL-93 |

---TOTALS---

Matrix# Samples

SOIL

9

ATI STANDARD DISPOSAL PRACTICE

The sample(s) from this project will be disposed of in twenty-one (21) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

ANALYTICAL SCHEDULE

Page 2

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: MINING SOIL

ATI I.D.: 307393

| Analysis | Technique/Description |
|---------------------|------------------------------------|
| EPA 376.2 (SULFIDE) | COLORIMETRIC |
| EPA 6010 (LEAD) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 6010 (ZINC) | INDUCTIVELY COUPLED ARGON PLASMA |
| EPA 7060 (ARSENIC) | ATOMIC ABSORPTION/GRAPHITE FURNACE |
| EPA 9038 (SULFATE) | TURBIDIMETRIC |
| EPA 9045 (pH SOIL) | ELECTRODE |

GENERAL CHEMISTRY RESULTS

Page 3

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: MINING SOIL

ATI I.D.: 307393

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-----------|--------|--------------|---------------|
| 1 | CRACK A | SOIL | 30-JUL-93 | 31-JUL-93 |
| 2 | CRACK B | SOIL | 30-JUL-93 | 31-JUL-93 |
| 3 | CRACK C | SOIL | 30-JUL-93 | 31-JUL-93 |
| 4 | CRACK D | SOIL | 30-JUL-93 | 31-JUL-93 |
| 5 | CRACK E | SOIL | 30-JUL-93 | 31-JUL-93 |

| Parameter | Units | 1 | 2 | 3 | 4 | 5 |
|-----------|-------|--------|--------|--------|--------|--------|
| pH | UNITS | 2.4 | 2.1 | 1.9 | 1.4 | 1.5 |
| SULFIDE | MG/KG | <1.0@Q | <1.0@Q | <1.0@Q | <1.0@Q | <1.0@Q |
| SULFATE | MG/KG | 245000 | 295000 | 320000 | 279000 | 294000 |

@Q DETECTION LIMIT ELEVATED DUE TO LIMITED SAMPLE FOR ANALYSIS

GENERAL CHEMISTRY RESULTS

Page 4

Client : WOODWARD-CLYDE CONSULTANTS
 Project # : 93C0243A
 Project Name: MINING SOIL

ATI I.D.: 307393

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-----------|--------|--------------|---------------|
| 6 | CRACK F | SOIL | 30-JUL-93 | 31-JUL-93 |
| 7 | CRACK G | SOIL | 30-JUL-93 | 31-JUL-93 |
| 8 | CRACK H | SOIL | 30-JUL-93 | 31-JUL-93 |
| 9 | CRACK J | SOIL | 30-JUL-93 | 31-JUL-93 |

| Parameter | Units | 6 | 7 | 8 | 9 |
|-----------|-------|--------|--------|--------|--------|
| PH | UNITS | 1.9 | 1.5 | 1.6 | 1.4 |
| SULFIDE | MG/KG | <1.0EQ | <1.0EQ | <1.0EQ | <1.0EQ |
| SULFATE | MG/KG | 289000 | 366000 | 299000 | 365000 |

EQ DETECTION LIMIT ELEVATED DUE TO LIMITED SAMPLE FOR ANALYSIS

GENERAL CHEMISTRY - QUALITY CONTROL

DUP/MS

Page 5

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: MINING SOIL

ATI I.D. : 307393

| Parameters | REF I.D. | Units | Sample Result | Dup Result | RPD | Spiked Sample | Spike Conc | % Rec |
|------------|-----------|-------|---------------|------------|-----|---------------|------------|-------|
| SULFATE | 307373-02 | MG/KG | 957 | 926 | 3 | 2600 | 1970 | 83 |
| SULFATE | 307393-01 | MG/KG | 245000 | 244000 | 0 | 715000 | 397000 | 118 |
| SULFIDE | 307393-02 | MG/KG | <1.0@Q | <1.0@Q | 0 | <1.0 | 19.9 | N/A*Y |
| pH | 307373-02 | UNITS | 8.2 | 8.2 | 0 | N/A | N/A | N/A |
| pH | 307393-09 | UNITS | 1.4 | 1.4 | 0 | N/A | N/A | N/A |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

*Y RESULT NOT ATTAINABLE DUE TO SAMPLE MATRIX INTERFERENCE
@Q DETECTION LIMIT ELEVATED DUE TO LIMITED SAMPLE FOR ANALYSIS

GENERAL CHEMISTRY - QUALITY CONTROL

BLANK SPIKE

Page 6

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: MINING SOIL

ATI I.D. : 307393

| Parameters | Blank Spike ID# | Units | Blank Result | Spiked Sample | Spike Conc. | % Rec |
|------------|--------------------|-------|-----------------|------------------|----------------|----------|
| SULFATE | 38484 | MG/KG | <100 | 216 | 200 | 108 |
| SULFIDE | 38431 | MG/KG | <0.20 | 3.4 | 4.0 | 85 |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

METALS RESULTS

Page 7

Client : WOODWARD-CLYDE CONSULTANTS
 Project # : 93C0243A
 Project Name: MINING SOIL

ATI I.D.: 307393

| Sample # | Client ID | Matrix | Date Sampled | Date Received |
|----------|-----------|--------|--------------|---------------|
| 1 | CRACK A | SOIL | 30-JUL-93 | 31-JUL-93 |
| 2 | CRACK B | SOIL | 30-JUL-93 | 31-JUL-93 |
| 3 | CRACK C | SOIL | 30-JUL-93 | 31-JUL-93 |
| 4 | CRACK D | SOIL | 30-JUL-93 | 31-JUL-93 |
| 5 | CRACK E | SOIL | 30-JUL-93 | 31-JUL-93 |

| Parameter | Units | 1 | 2 | 3 | 4 | 5 |
|-----------|-------|------|------|------|------|------|
| ARSENIC | MG/KG | 29.6 | 11.7 | 23.0 | 7.4 | 33.0 |
| LEAD | MG/KG | 16.1 | 18.3 | 28.2 | 14.9 | 9.3 |
| ZINC | MG/KG | 6080 | 6790 | 6200 | 7990 | 8380 |

METALS RESULTS

Page 8

Client : WOODWARD-CLYDE CONSULTANTS
 Project # : 93C0243A
 Project Name: MINING SOIL

ATI I.D.: 307393

| Sample Client ID # | Matrix | Date Sampled | Date Received |
|--------------------|--------|--------------|---------------|
| 6 CRACK F | SOIL | 30-JUL-93 | 31-JUL-93 |
| 7 CRACK G | SOIL | 30-JUL-93 | 31-JUL-93 |
| 8 CRACK H | SOIL | 30-JUL-93 | 31-JUL-93 |
| 9 CRACK J | SOIL | 30-JUL-93 | 31-JUL-93 |

| Parameter | Units | 6 | 7 | 8 | 9 |
|-----------|-------|------|------|------|------|
| ARSENIC | MG/KG | 8.4 | 9.7 | 22.4 | 25.7 |
| LEAD | MG/KG | 35.1 | 19.7 | 15.9 | 18.5 |
| ZINC | MG/KG | 4320 | 6260 | 6110 | 5820 |



METALS - QUALITY CONTROL

DUP/MS

Page 9

Client : WOODWARD-CLYDE CONSULTANTS
Project # : 93C0243A
Project Name: MINING SOIL

ATI I.D. : 307393

| Parameters | REF I.D. | Units | Sample Result | Dup Result | RPD | Spiked Sample | Spike Conc | % Rec |
|------------|-----------|-------|---------------|------------|-----|---------------|------------|-------|
| ARSENIC | 307393-09 | MG/KG | 25.7 | 22.3 | 14 | 58.4 | 49.8 | 66 |
| LEAD | 307393-09 | MG/KG | 18.5 | 20.3 | 9 | 52.1 | 49.9 | 67 |
| ZINC | 307393-09 | MG/KG | 5820 | 5300 | 9 | N/A | 49.9 | N/A*V |

% Recovery = (Spike Sample Result - Sample Result)*100/Spike Concentration
RPD (Relative % Difference) = (Sample Result - Duplicate Result)*100/Average Result

*V SAMPLE RESULT IS >4X SPIKED CONCENTRATION, THEREFORE SPIKE IS NOT DETECTABLE.